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Thomas A Edison Papers

A SELECTIVE MICROFILM EDITION

PART IV
(1899–1910)

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Notebook, N-07-03-19

This notebook covers the period March-May 1907. All entries are by Edison. The book contains notes regarding projects to be undertaken and hypotheses to be tested, along with other theoretical speculation pertaining to the properties of electricity. Included are entries relating to x-rays and "xyz rays," the electromotograph, storage batteries, and incandescent lamps. Several of the ideas were tested, and the results are noted by Edison marginalia. The book appears to have been used primarily at Fort Myers, Florida. The front cover is labeled "Experiments & Theory." The book contains 198 numbered pages.

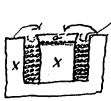
March 19 1907

Use Radium near surface of chalk of Emq lead shutter, also if get sounds, try a lot of
1 matter, metals, and oxides etc. Possibly other radiations not discoverable by Elec, Photo, Try X ray tubes and light etc also different chemicals to wet chalk.

As there is a stress in a dielectric and movement
2. of molecules its probable a chalk wet with non-condrs will alter friction in Emq

See if X ray radium etc alters capillarity
3 in glass tubes of any liquid.

4



X X magnet
G glass dish to
Crystallize in magnetic field, felt between dish and mag

5

Crystalize fflourescent and phosphorescent crystals in closed box in dead dark, absorbing water, with H_2SO_4 = Use cold saturated solutions, then see if more sensitive to X ray and radium

6

Run down why different chemicals on slides gave black rings on photgha fflourescent crystals.

7

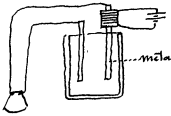
See why Lead point on chemical paper gives black marks on Cathode, is it PbH.

8

Use sodium salts near pure Bunsen burner flame, use spectroscope, then let X ray and Radium strike crystals + note if any sodium molecules are split off and thrown into flame. Try Thallium, Lithium

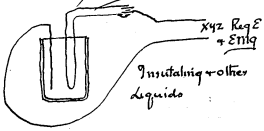
9

See if absorption spectrum of solutions is changed by X ray and Radium passing through straight and at right angles also when subject to X and magnetism and Electric stress as well.



Run set expmts all combinations for E also try XYZ instruments, Emg

11

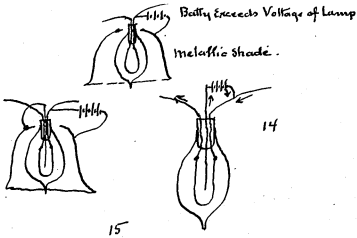


12

See if Al_2O_3 can be deposited on solid polished metal Nickel for instance to permit of electrolytic rectifier, try Beryllium,

13

Experiments to neutralize carrying in incandescent lamps.



With center wire see if Emg will detect oscillations make center wire of different metals see if secondary current increased.

16

Try CP Benzol cell, metallic electrodes, one bare the other coated with a solid substance by dipping in a melted solution of a substance which dissolves in Benzol. = Use intermittent break XYZ & E + EMG instruments.
also try CP Acetone Anhy Conc H_2SO_4
Use melted Organic salts which will cling to electrode when dipped therein
Try various metals.

17

Try precipitating in Tubes in a helix ditto powerful magnetic poles. also prepare colored precipitates in dead dark dry them + note color in daylight.

18

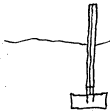
Make crystallizations in the dark.

19

See if can photograph Aluminium scintilizations with Condenser contact, Leyden - ditto
Cerium Magnesium + metals which give white light, Make alloys metals see if can roughly decide % of each,

20

See if magnetic lines alter surface tension of a drop, different chemicals also heigths of different liquids in capilliary tubes



Albert coat capilliary tube with gold, divide it in 2 halves connect to E XYZ etc see if stress alters capilliarity.

21

Howell – flash with Bisulphide carbon then heat elec furnace tube

22

Dr Grothe make CP Carbon monosulphide, squirt carbonize, bring up in electric furnace tube.

23

Run down action hot linseed oil on bamboo fibs to make them elastic like rubber

24

Apply radium tube to pot with flower stalk see if in time it kills it or affects it like a human being

25

Grow a vine in a pot in dark and water it with chlorophyl juice from green plant. Use Peas.

26

Try effect of Radium on ants ditto X ray

27

Test in lab wireless with X ray Tube, or perfect Vac at end of atennae
Also Ultra violet light striking latter, see if increases sensitiveness

28

Wireless receiver Telephone with Tuning fork attached each diff Tune with damper on fork also resonator Tuned to right note,

29

Try aluminum condensor in atmosphere almost saturated with moisture, or Aluminum dry rectifier coated with paste of phos + Carbonate Soda and perhaps carb Stronlia -

30 = Tried - not good — May 1907

30

Emg strontia carbonate cylinder moistened with aluminate soda. ng

31

Sucburate of Tetraethylammoniumhydroxide to dissolve uric acid concretions form Urate of Tetraethyl and sucburate Lime.

32

Measure resistance of various magnetites natural and artificial and in various ways

33

Manganees alloys which are magnetic try and make by chemical precipitation ditto Chromium.

34

Dry Osmose Cell with porous partition, different gases on either side Light, heat, magnetism Elec X + Radium sound on one side to cause gas diffusion = to detect dif pressure use U tube filled with a liquid.

35

Of liquids water best conductor of heat The worst are certain Ethers Ethylene Bromide Amyl Iodide Ethyl Iodide

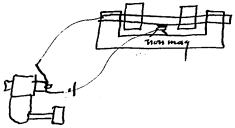
Tried this = 3 gal of Tetra put out 1 gal gasolene under any condition —

36

Tetrachloride of Carbon for use as a gasolene fire extinguisher in Garages – try experiment

37

4@6 inch rods ½" dia in powerful helix silver disk carbon forced into silver by hydraulic laid on end rods or thus



38

Thermo along Aluminum, Iron, and other bars, vibrators connected each Thermo or mirrow galvanometer = Now make an Arc at one end see how quick heat flows also try one end red hot & sudden quench

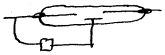
39 X

39

Think Edison effect will be shown on alternating arc by connecting P or N to a galvanometer and thence to polished plate held near arc so ultra violet light strikes it.

40

Probably same thing in vacuum tubes
X ray Tube



41

Probably the slides of crystals with black paper and laid on dry plate and exposed to sun that sun will cause some crystals to give a ray which will penetrate the paper and record – use 40 mesh screen over dry plate, also try with Electric and Hg Tube arcs –

42

Perhaps a short coil of wire like a sounder spool, Vibrator or key like old Etheric, powerful storage battery and wire ending in a sheet of metal held over slides, the slides being laid on grounded table produce flourescence of crystals are tuning forks of high rate

Possibly crystals laid on end iron bar and magnetized, the click may give high note

43

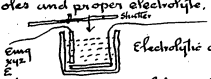
Flourescent crystals inside of a powerful helix, very low resistence, make and break X ray wheel, also Leyden jar.

44

Take a plant and connect a plate in soil, and battery and put tin foil around it. Use two plants, put current through each plant in different direction
Emg action on sap.

45

Should be able turn radiant light heat, Either into Elec or XYZ by use of metallic poles and proper electrolyte.



for detecting use revolving shutter, also use polarized light on electrodes one a radiator the other an absorber Also use gold vacous deposit, let light pass through

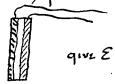
46

Possibly all rays except one rate vibration filtered out, or ultra red strike one pole ultra violet the other, possibly with iron receiving ultra violet it will oxidize use NiOH + Ni other pole, possibly Thermo of 2 Vacuous deposited metals, ultra violet pass through one, and red through the other All the above is likely to give XYZ hence try various receivers

48 = Tried May 1907 works ok — Citric acid test

47

Glass cell vacuous deposit one side, different metals, fluids inside, light shines through



give E X4Z

48

Try aluminum rectifier for Quad 4 cells Of in bridge, see if jumps on reversal if condenser around relay make it sluggish or use shunt. OK — lasts a week or more

49

Nickel strip with stearic acid over it → in 1½% KOH. with $N(OH)_3$ or not should give current as stearic acid dissolves it electrifies and can continuously discharge.

50

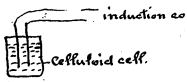
Instead of a grounded metallic circuit to try X4Z. use 10 cells storage battery in Multiple but with both poles of sheet zinck in $ZnSO_4$.

51

Possibly the Emq on account of its rapidity will show that a wave goes over wire before it changes the insulator, by alternating currents might send elec message by rapid alternations broken up into dots on uninsulated wires in the sea. possibly Aluminium rectifier 4 cells style - Try wireless this circuit.

52

Possibly wireless might work on the Atlantic cable, try this on artificial cable.

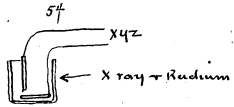


insulating liquid, see if XYZ ray comes out, · with gold leaf. photo plate and fluorescents Try Benzol etc.

53

See if X ray or radium is more or less absorbed by passing through liquids or solids when same are in a helix or electric stress, chilled, hot.

54



different metals for electrodes + different solutions

53—

Rays lower than heat but higher than sound possibly detected by very light moving parts of a high speed Emg using revolving shutter ray striking surface of the chalk in path of the pressure foot.

56

Also on a cell with electrolyte, ray shining on cathode or anode, or a current passing and depositing, say Zinc the ray shining on anode or cathode with shutter, possibly low inductance coil, with or without iron, possibly Aluminium rectifr wet or possibly dry possibly some metals give off a ray that will alter the friction.

57

XYZ cell. Iodine or Bromine dissolved in insulating liquids, different metals for electrodes = vibrator used, Emq XYZ receivers, possibly carbon form one electrode as its not attacked, might use Tetrachl. Carb Chloroform + liquids not attacked by Br or I.

58

Cylinder for Emq formed of Oxalate Lithia possibly alter friction by arc light.
Try cylinders other Fluorescents and phos. and see effect of light, X + radium + XYZ rays. Use shutter
Cypress Benzoates etc.

59

Try Edison effect on platinum, Tungsten, Tantalium lamps.

60

Howell flush filament with CS_2 treat Electric furnace

61

Squirt asphalt, treat with Sulphur so dont melt,

62

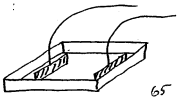
Silk thread dip in asphalt sulphurize many times and dip many times

63

Ramie single fibre, preluminarize then dip asphalt sulphurize reprelumin + re dip + so on. instead sulphurizing treat each time HNO_3 or hot hypochlorite Hypochlorious acid,

64

Humus dissolved in ammonia etc also humus deoxidized by hot SnCl. try NHy Sulfide



65

Pass powerful current thro liquid use thin sheet electrodes so get heat quickly Crystalize

66

In using Emg where the ray strikes the surface of the chalk cylinder always try high speed of rotation as effect may be very short, also use shutter

67

X4I receiver, capilliary tube Hg and another liquid, alterations at contact give signals.

68

Crystals while under fluorescence or phosphorescence, electrify—Magnetize pass light thro iodine in CS_2 also colored liquids

69

See if needle like crystals have any directive force Naphthochloronaphthalene

70

Emg with smooth crystals on point of pressure foot instead of metal.

71

XYZ Recvr Very thin bulb exhausted and 36 inch Capilliary with Hg in it.

72.

Ditto 2 Electrodes sealed in bulb capilliary Tube therefrom ray changes capilliary column

73

Electrify a platinum wire with loop at end on which is a salt giving a spectrum Try X + Radium.

74

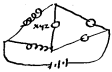
See if X ray of Radium alters Edison Effect.

75

See if drops of Bi Sul Carbon in water Column affected by E Mag X or Rad XYZ.

76

Emg galv ele balanced in bridge
Large voltage, 2 cells. X4Z ray ele
strikes one cell disturbs balance,



77

Try non electrolyte to wet chalk,
then try E X Rad + X4Z.

78

X4Z Receiver a wire dipping into
non-electrolyte with a drop of electrolyte at
its end.

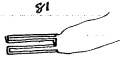
79

Ditto A capillary tube with electrolite and
immersed in non electrolite – ditto with
osmotic membrane over mouth of tube

80

Try fluorescent crystals immersed in
Electrolites and non electrolites

81



Lead and Aluminium doz couples. Let X or radium strike juncture – E + XYZ receivers

82

See if X or radium ionize – non-electrolites
use current high tension induction coil,
also use cathodes and anodes different metals

83

Flourescent crystals containing small admixture of iron salt, Then magnetize, vibrate X Rad

84

Opalescence in a tube by precipitated Sulphur – act on by all the rays + current.
try other opalescent Solutions,

85

Try X + Rad on fluorescent crysts in liquids which do not act on crystals, try different temperatures

86

Subject lead to very high temperature by an arc light, afterwards test for Silver
Keep arc on one hour
Ditto Manganese test for Cobalt
" Copper " Silver + platina
Iron + Sulphur " Gold.

87

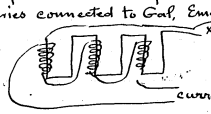
See if Line spectrum changed by subjecting glass prism to X ray Radium, Magnetism Electric sparks

88

See if beam light deflected from polished surface of many metals and alloys I had made in Electric furnace. when powerfully magnetized

89

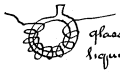
Sheet flake Ni Cu 60 layers in helix in series connected to Gal, Eng XYZ Revro



90

Work out experiments from analogy of a coil doing work on iron and giving a current opposite the energizing current, and a storage battery giving a current just the reverse

91



glass with helix, different liquids for induction

Alloy buttons made by arc have hole bored in and helix wound

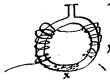
test for induction. look out some may take hours.

to change S

Keep in hour.

Try without hole in plain helix

Liquids –

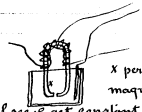


x fluorescent crystals

92

See if regular test cell storage battery is affected when in helix or strong field X or Radium use glass cell. also try light,

Not affected –



93

x permanently magnetized steel magnet, plate iron on it & with coil see if get constant inductive current due to accession of iron, use mirror galv.

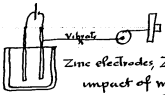
94

If magnetic self induction time is at the square of the length of the magnet or closed iron circuit then if one foot discharges in 1/100 of second a circuit 320 feet will take 16 minutes to discharge 4 hours if 1280 feet, use wire made up of strands prevent facults
If properly proportioned to work on best part of the saturation curve should give a good storage battery to float on Street RR Circuits where current only wanted for few minutes

95

this gives a kick

does this, what does it do
try Pi + other metals outside



Zinc electrodes, $ZnSO_4$ – impact of metallic ion

see if sound heard in Emq on Vibrating

97

Fluorescent crysts on back of Zn Electrode, both Zn electrode in $ZnSO_4$ – see if impact of metallic ion jars molecules. might fuse $CaWO_4$ to platinum + try

98 NO_4 is something

Fluorescent Cryst on face magnd, alternate

99

Iron when magnetized may be decomposed into two different kinds of iron molecule – or a compound molecule into 2 simpler molecules. if so dissolve iron strongly magnetized, in H_2SO_4 + other acids or Halogen and test quality of result.

100

In case of charging battery, work is done by raising potential of Fe + O. and current is given in opposite direction to primal current whereas with Fe current is in the same direction hence there is a <u>combination</u>. of something in charging and decomposition on discharging from simple to compound molecules probably. when magnetized the molecule is compound and more complex and this decomposes when current goes off. if the simple ion or molecules are charged like electrolytic ions This compounding should set free a charge which acting on the Aether opposite to the current or stored up as a stress in the Ether. perhaps by dissolving off highly magnetized Iron when the molecule is complex we shall get peculiar iron salts, say acting on iron in Ether with Bromine

101

As Fe salts are magnetic they should give different reactions when magnetized Magnetizn of iron pole of storage should affect the Voltage.

102

Try the dissolving times of section closed iron ring powerfully magnetized + not magtzd

103.

Put Emg in circuit where plating and decomposition taking place. also in secondary coil in primary coil of which decompstn + plateing going on to see character of sounds

104

To detect waves higher than sound waves that can be heard by ear fasten to diaphm of Emg pocket of flourescent cryst also a thermo couple and a wire from diaphm rubbing on its junctiue use mirror galv also wire rubbing on chalk to generate current, Control sensitive flame.

105

Translucent + clear cylinder
Ray shines through cylinder + alters friction

106

X iron cylinder helix magnetizg. pens with various metals

107

Use Tetrachloride Carbon Aq Hg Pb electrodes high voltage current see if Halogen combines with the metals, intermit the voltage, heat.

108

A magnet is sensitive to jars use a telephone let X ray. Radium, XYZ strike end, use regular coil also coil with only few turns, connect to Emg or XYZ instruments or Gal This should turn sound and vibrations lower than heat into E. permanent mag for quickness should be formed bundle very fine steel wires hardened and magnetized

109

Diaphram, chamber and listening tubes or recording monometer over artesian well at Ft Myers for earthquake records Moons attraction

110

Cylinder of solid Potassium Silicate for Emg

NG

111

See if scintillations of different metals are deflected by magnet, or condenser disch^g see if take place in non-electrolites

112

See if iron wire circuit including a Emg and surrounded by helix cause click to give current, try XYZ receivers use vibrator and sharp wave

113

See if old etheric spark given off by cores of dynamos.

114

See if old Etheric with Aluminium Rect^r affects Emg.

115

Use 4 way bridge Al Rect with Emg for wireless.

116

Wet Carb Strontia cylinder on Emg with Caustic Strontia water this will absorb CO_2 and make pores finer and increase sensitiveness after being Carbonized use KOH, NaOH LiOH, CsOH RbOH, Try K_2CO_3 Li_2CO_3 Aluminate Soda.

116 Dont work any better than Reg KOH see notes in Reg Emg book May 20 1907

117

Aluminum cylinder coated in cell heavily with Al_2O_3 by current for Emq

118

Cocaine, Aconite, seems to stop transmission of pain along the nerves if the effect is electrical then Cocaine should show some electrical phenomena, or be the means of insulating "nervous force" possibly put in KOH in battery it would show something

119

Will Cocaine affect a sensitive plant Venus fly trap

120

Will Cocaine affect the nerves at a distance if in mass and prolonged time will effect pass thru matter.

121

Try Radium on Cocaine cryst to force into hand
also electro osmose ~

122

Watch glass paraffined, drop water, two platina wire electrodes - dust on surface, also opal by precip sulphur, X Y Z receiver also other rays. . Glycerine surface + drop non-electrolite

123

Glass tube, particles floating in liquid, see if AC or DC cause rotation of liquid - also magnetic oxide in suspension - Opal, $Fe_2O_3 OH$,

124

Vacuous deposit Nickel so Transparent, put in Helix see if affects amount of light

125

Make Vacuous deposits many metals pass beam light thro, + use helix, also subject it to Rad + X ray. see if X or Rad throw current, or X Y Z into helix;
make some thus closed ring wind

so can have helix thru hole

126

See if Aluminium wire will act as Relay in sea water – if so bare wire cable feighy possible.

127

See if hydraulicly pressed 1" cube Cocoaine effect a sensitive surface at a distance, or through thin celluloid,

128

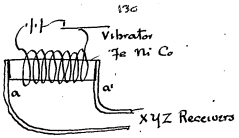
See how long a 1/4 iron wire 25 feet long plated with Copper 1/64 inch thick will retain its magnetism, wind one layer wire onto charge it,

129

When work is done on a magnet (18) energy stored up, where does it go to when the helix circuit is opened?

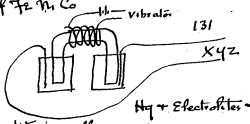
Think it goes off as ether – vide old Experiment,

130

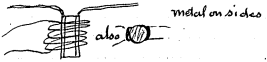


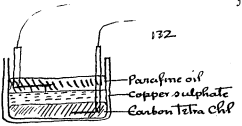
Metallic circuit a a' same and different metals, leading wires of same metal + different metals = some cases plate the same metals both end or one metal one end another metal opposite end other cases connect mechanically - some cases use core made up of many wires of Fe Ni Co

also

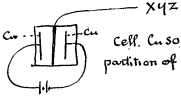


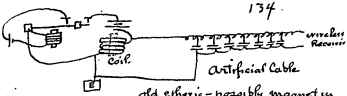
non electrolites in cells - some cases connect to iron direct on one pole but use cell on other vary metals in cell. also plate ends iron dif metals



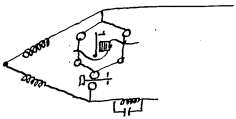


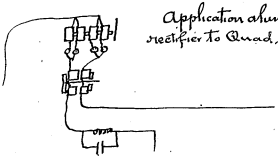
Send heavy charge through, should act as condenser and send a current through Cu. Sulphate and deposit metal which should sink thru the Tetrachloride.





old etheric - possibly magnet in helix -





Application aluminum rectifier to Quad.

Wk fine

A condenser may store its charge not by setting up a stress but is electrolytic like compound or complexes are formed in which absorb energy on discharge return to normal, Colloids are generally used & have high so-called electrolytic capacity it may be the action of the current is towards forming crystalization towards & this is known to alter the energy.

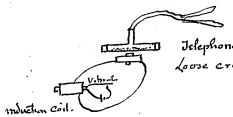
136

On page 33 is shown magnets for experiments under theory that free iron molecules under magnetism combine to form compound molecule - an non electrolite so to speak. Vary it by using many diferent metals instead of iron in the way mentioned also alloys -

137

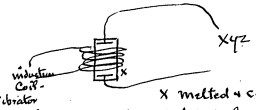
See if scintillation are deflected by a magnet also if changed when helix with current around them - also scintilate by condr discharge from rod dif metals surrounded by a helix -

135



Telephone cha listening tubes
Loose crystals,

139



X melted + coat salts
with immersed metalic pole, make
Each pole same also different metals

140

Find out what it is that phosphoresces in
Edison on by heat. when get a supply
see if phosphorescence continuous as
long as heat applied, then see if phos
by alternating Electrical stresses,

141

Make some large crystals of complex Crystal say those crystalizing in Magnesium system, also a number of other compound Crystals $7H_2O$ + also anhydrous, test them in various ways.

142

Make a number of rods ½ by 3 of fused salts also alloys of dif fused salts, Inorganic + organic and mixed for Experiments.

143

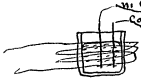
Continuation of Exp'nts p 33. make amalgams of Fe Ni Co other metals put them in test tube in helix. insert Electrodes in the liquid amalgam same as in a battery. Change helix BC or AC - use all receivers XYZ etc.
The liquid Hg probably give mobility to Complex iron molecules - possibly one kind iron molecule be found one pole + another at other pole.

144

Might try compound amalgams such as Silver and Zinc.

possibly deposit on poles take place. - possibly simplex & complex Fe ions differentiate

Cu Fe not amalgamated



145

X-42

146

Try induction kick

Hg amalgam of metals and alloys - glass ring tube.

Experiments with slides containing crystals

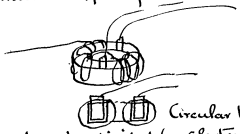
Put in dry plate with removeable slide over it very thin aluminum. Then slide, then the cover Keep slide in between dry plate and crystals but take off cover and expose to arc etc now put on cover + pull slide between dry plate + crystals, hold 5 minutes then put in another dry plate + give 5 minutes + so on until no photo effect given – This will give relative duration of phos = There is very little doubt but that some crystals will phos so high in Ultra violet as to be invisible to eye and this will bring them out

148

Etheric XYZ sources. fuse inorganic salts in platinum, porcelain nickel capsule or crucible – use different electrodes use base salt + add other salts soluable in fused salt, use vibrator XYZ Receivers – also on cooling down

149

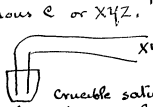
Continuation expmts p 33



Circular trough

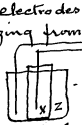
Hg amalgams - divided by electrodes (10) dip in - energized by coil wire - might have a secondary wire see if Continuous C or XYZ.

150



Crucible saturated solutions different electrodes see if C + XYZ on Crystalizing from hot solution.

151



Saturated solutions hot X porous pot with acid salt or neutral Z alkaline salt, also both neutral, crystz in same & opp systems different electrodes & both same.

152

See if absorption spectrum is altered by Electric + magnetic stresses hot and cold by X Rad

---

153

Several small porcelain Crucible all heated together with saturated hot solutions of soluable salt, organic + inorganic - place of the whole very thin sheet aluminum and a dry plate on 20 mesh screen. see if XYZ ray comes out on crystalizing

---

154

Cell with different electrodes and solutions
½ cell + one electrode guarded by heavy sheet lead from X ray Shutter = XYZ Emg + E Receivers.

155

Nickel hydroxide is ionized according to Ostwald as it shows green nickel ion – try magnetic and electric stress to change color.

156

See if Nickel peroxide, hydrated and anhydrous is magnetic ditto Co.

157

Ralph Abroquat precipitate 4 oz lots $Ni(OH)_2$ with 10% of each kind of metal possible ie + ous salts – ½ wash not filtered, dried low heat.

158

Also lot from Chloride + Nitrate ½ Wash not filtered dried low heat.

159

Crystalize Organic hot liquids under Electric stress of 125 volts or higher also try Alternating.

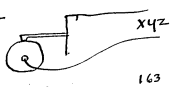
160

Crystalize Organic + inorganic salts which are colored in the dark, dry + see quantity color, also under arc Carbon + Hg –

161

In telephone diaphragm connected to tuning fork work phone by induction coil whose inductance is in time with vibration period of fork.

162



XYZ ε εTε Eng

163

Iron cylinder polished - pressure foot iron vary with all kinds metals, both cylinders and presser rotate several hundred times min. also magnetized

164

Dry storage - flat Nickel sheet, paste .005 thick green hydroxide Ni moistened 10% KOH. Ni plate coated plate regular iron moistened 10% KOH. sheet tissue paper between.

165

Melt some Aluminum by Current in Vacuum get present of unmelted residue - ~~[illegible]~~ quality of metal analyze ~~[illegible]~~

166

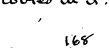
See if oxides having same specific grav as Aluminium will alloy with it – also other compounds.

167

Drop water on paraffined watch glass two platina wires in it. X4Z Rays

168

Find if Marshall the Condenser maker makes artificial Cables, Yes ordered



169

170

Wet Eng cylinders with plating solution using anhydrous oxides etc for cylinders. so solution has no chemical reaction by DC+AC – induction coil also.

171

Plating cell with porous cup soaked with solutions & then precipitating in the pores, say ferrocyn Cu & others. Then deposit Copper on the walls of porous cup. will lead to something.

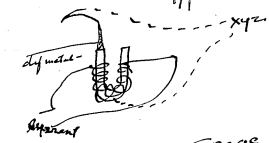
172

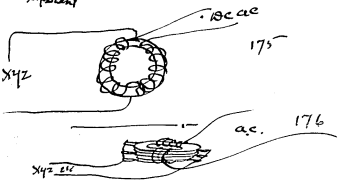
Make an insulator which has metalic iron Reduced by Hydrogen in it. so the static & magnetic oppose & neutralize this diaelectric should be good for Cables Telephones. A spiraly wound iron wire over the insulation should answer.

173

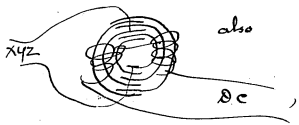
Closed ring with few turns wire, in bridge to determine Kick Then put whole in oil & determine then subject whole to hydraulic pressure and determine. think under great pressure Iron will not hag & will do more converting work.

174

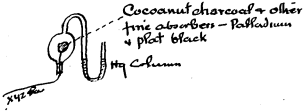




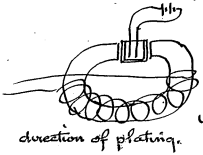
Disks hole in center of Iron. iron 003 thick
parafined paper between build up 50
sections



177



178



See if an variation of voltage according to

179

X Ray break wheel and little Etheric coil, just break, wind coil in Vacuum.

180

Get good supply Rare metals, those cannot get reduce in Elec furnace or make alloys.

181

Try Emq with the pen faced with a very thin non conductor like Mica, use a highly polished metal cylinder, use all metals that cylinders can be made up and try all kinds diaelectrics + sections of crystals that can be got thin with every metal, Use coil.

182.

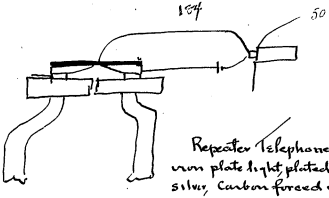
X a diaphm forced in against lugs of closed ring –

Theory is iron expands + contracts on magnetizm + will throw dia into vibration

183

Run a series of experiments on Magnesium electrodes for plating upon in KOH NaOH LiOH, + generally – investigate the phenomena of it plates through the oxide – Oxidize it thick by Current + then plate – See if MgO Can be plated on metals to form films.

184



Repeater Telephone
iron plate light plated
silver, Carbon forced in

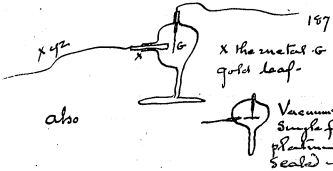
185

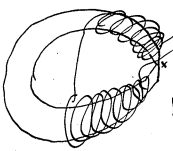
Try Jungolin bronzes in Telephone
ditto as thermo couple with other metals

186

As there are no means of detecting slow
or long waves. possibly the observation
that high note tuning forks attract can
be used as XYZ Receiver

187

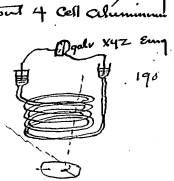




Ray strike at X alter the magnet lines — possible wants an air space 1/1000 inch — also

187

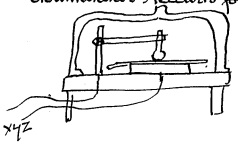
wire fit in gas over which X4Z vibrations coming — also only few turns wire a — X4Z receivers in wire circuit Eng — with and without 4 cell aluminum rectifiers,



188

glass tube spiral Zinc electrodes, $ZnSO_4$ move lines of X ray to cut spiral, try light, Mag.

Accumulative receivers for XYZ

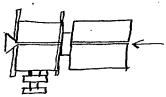


Use ball about 1/8 @ 1/4 dia resting on sensitive paper.
for alternating Use a paper which is sensitive for both waves, also use other sensitized paper dry or not depending on a current.

Iodide Pot starch Platina ball
Nitrate Manganese "
paste of $Ni(OH)_2$ on "
paper moistened KOH "
Ditto Cobalt Hydrox "
phenol Phthalein with neutral "
K or Alkine salt, "
Analine Hydrochloride
Blue print paper.
Chloride Cobalt paper

Vanadium salts — Platina Gall
Uranium salts, — "
Molybdenum · Organic mat — "
Tungsten — "
Tellurium Gall,
Chloride ferrous — Plat Gall.
Halle ☉ further list in big book.

192



Beam of light passed through long slit about .0001 wide thence through solutions and Crystals + other matter - observe beam direct with eye, or use a spectroscope subject the solutions or crystals etc to helix DC AC — Electric Stress continuous and alternating - also heat Light X Rad X Y Z adjust slits parabolic + Cause some forces to deflect or alter spectrum or absorption if can find anything it is sensitive to use it for a receiver.

193

Make a cell about size of a 4X3 Dry plate, use celluloid sides, also glass, mica – make it narrow say 1/2 inch (12) thick so it can be used in a Camera

also anodes of many platinum wire or other metal when plating solutions are to be used

put plate in camera and use carbon electrodes and NaCl. put on very weak current to form chloride on Ag plate, at same time light reduces it, wash & develope reg way also have gelatin dissolved in solution.

Try NaBr NaI NaI NaCl, + various combinations – CuPlate

With this apparatus and fine gauze or screen as anode a vast number of Experiments can be made with all salts sensitive to light, + heat,

Possibly there are many metals which will have their surface altered by light, either as a plate of when 000001 thickness is plated on

194

Possibly with Quartz lense & using Ultra violet light many phenomena arise

195

Perhaps polished plate with image focused on by Quartz lense and plate connected with silent discharge of low voltage that the Ultra will start glow on bright parts & not on duller,

196

Try Spectrum on metal plated films

197

Also on plate in presence of Chlorine & Quartz lense images #

198

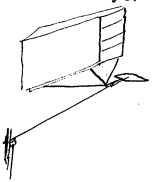
Can probably dispense with Lenses & use the pin hole method

199

There is little doubt that reasons why amplificating phono records by leverage is in the bending of the lever due to inertia & elasticity

200

Aerial naught revolving pole, wires with cigar shaped lead at end, reel to let wires out and box kite end each wire - 3 or 4 section box.



201

Fluor Spar Apatite, Become phosphorescent by heat, this is gradually lost, is restored by subjecting to induction Coil spark — Hence arrange Fluor Spar under Continuous Elec stress and heat for constance Phos Lamp —

202

Try slow dehydration of good crystals in hot Castor, glycerine when not sol. Chl Calcium Linseed oil - under Hg. Stearic acid Parafine,

203

Try slow dehydration and reduction in Hydrogen of unmeltable crystals

204

Fuse Cupric Sulphate with K + Na Sulphates, oxidize Cu for Lelande. also reduce by Hydrogen, make into plate and then oxidize for Lelande

205

In making non-pyro iron from crystals that is hard to prevent from catching fire, or cant be prevented, let in Conc KOH, also NH_4 - also Hydrocarbons CO, N.

206

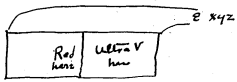
See page 55 - plate coated with $Ni(OH)_2$ and peroxidized, and then put in cell the light ought to reduce perox to mon ox + give picture, perhaps dry plate could be made with fine mush of Ni_2O_3 mixed with cold gelatin + put on plate + dried then light in conjunction with the organic matter would reduce the perox as its endothermic, a little heat might assist, Perhaps radiant infra red might act on it, if its reducing.

207

Ultra Violet is reducing I find by looking up "light" in Watts and Red is oxidizg

208

possibly a thermopile worked by light possible



209

Various metals in solution one pole receiving Violet the other red—

possibly by alternating the light by a shutter

210

and with proper metal electrodes and electrolite, with Aluminum rectifier. Sunlight might be utilized Commercially or Alternating Ct motor.

211

Possibly cells could be made with same Electrodes but divided cell, or dif electrodes in each side of cell a different solution and light rays sent through one only or both, or Violet thru one red thru the other giving E or XYZ.

212

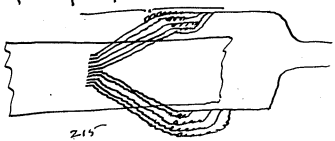
Determine the amount of frothing in 9·11 13 up to 33% KOH ditto NaOH. ditto KOH with a constant of 2 gms LiOH. ditto NaOH, also KOH from Sulfate also NaOH from Sulfate a metal.

213

High speed cutting tools - powerfully magnetize them see if harder

214

See if strong magnetism hardens soft iron



215

To record alternating waves on chemical paper, more + more Reo in pens as they recede from the center, O pens on one side H pens on other

216

Greenly make some Nickel flake 1/4 thick .000025. to be used for coating $Ni(OH)_2$ then used with regular flake.

217

Heat copper wire .001 dia with Carbon then eat out copper by our flake solution, continuous movement in solution - Then when free Cu, bring up to graphitizing point in electric furnace Nickel or iron wire, then brot up red in chlorine, volatilize Fe or Ni

218

I have idea that the less the fall of voltage per inch of length of any filament the higher the temp it can be worked at, by flashing Copper wires very fine, graphitized carbon could be made 2 or 3 times the present length with same radiating surface and get very high economy.

219

See if viscosity of various solutions through various tubes altered by X, Rad, & Mag Light, XYZ

220

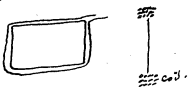
Ions are probably coming off of all matter continuously, probably accelerated by Heat, Light, Elec Mag X &c
Accumulate ions on moist paper having the best color reagents for the material used. Pass X ray thru metals (thin) & catch ions torn off into reaction solutions or paper.

221

Filaments of Conducting powders with nonfusible powders, Use induction coil + Condensers. Low voltage

222

Page 55 slide polished iron sheet surrounded with Coil.



223

powerfully magnetized see if picture can be developed after magnetism off by vapors of acids Alkalis gases or dry powders etc.

224

Nickel disk also other metals which do not amalgamate with Mercury - immersed therein and connected to diaphm. relative Hg - pass currents thru also XYZ Receiver

225

Aluminium rectifier with plating solution to diminish gas rque economy

226

Aluminium plate polished and coated with oxide electrolytically use in p 55 also dipped in solutions

227

Aluminum oxidized, use as cathode to plate on for easy stripping

228

p 55 polished plate possibly oxidized to black in saturated cold solution Lime water Light causes rise of temp at surface diminution of sol + deposit of Lime. Could develope with phenolphthalein etc $CaSO_4$ does same

229

Try Geissler Tube with induction coil Current thru Alumn Rectfr.

230

p 55 Silver plate coated AgCl Br or I Hydrogen in cell want see if can get rid animal matter

231

Copper plate Acetylene gas in cell. light causes form C_2H_2 cuprid -

232

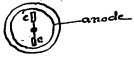
Collodion silver solution in presence Hydrogen to get rid animal matter possibly water must be present.

233

Copper plate dry H_2S. Light causes decomposition

234

Electrolytic gas motor



Vanes insulated on opposite sides, evolved hydrogen cause rotation.

235

Mercury - Lead + other anodes immersed therein, iron nickel, cobalt, Aluminium + magnesium electrodes for cathode dissolve lead or other metals in Hg (IC) metal same as anode - also, Carbon, Pt electrode for anode K or Na Li dissolved in Hg see if plating or other phenom occurs — perhaps Alumin rectifier action Also Molten fusible metal with above instead Hg -
Also Lead Tin Sb_2 Bi + other low fusing metals to form definite alloys; see if plating take place - ditto under magnetic lines parallel + right angles

236

D'Arcets alloy when amalgamtd melts 45° Cent use for making casts insects Try disk record -
1 pt Pb 1 Sn 2 Bi 10 Hg 1st 3
fused together then Hg added -

Fusible alloys	Pb	Bi	Sn	MP
Hemley	1	1	1	127° C
Rose	1	2	1	94
Newton	5	8	3	95

all solidify 98° C

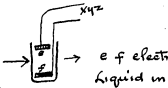
See 193= Oxide Pb + Ag obtained by adding KOH to Sol of a Pb salt mixed with Ag salt. Yellow precip insol in excess. Excess of KOH dis the PbO out, easily blackens by light make plate of it - also try it in gelatin Also see sensitiveness for X ray etc. PbO_2 reduced to red or by light

237

Adularia struck with a hammer so as to split it, emit at each crack, a light which may last for several minutes and when ground in a mortar appears all on fire

238

Wireless receiver



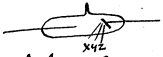
239

e f electrodes dif metals
Liquid in cell absorb X-heat
light, Rad mag- rays absorbed. those absorbed
may pass over electrodes in some form
use shutter

240

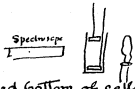
X ray tube paste
or secure metals
and salts so ray passes thru - carries
particles to chem reaction plate xy

241



X ray: tube filled with insulating liquids
Exhausted of air see if any ray comes off

242



Cell filled with an electrolite notice concentration at top and bottom of cells by action of current. Ditto the formation of new compounds by oxidation and reduction which will give new absorption spectrum.

243

Notice on water last night that the moon itself after looking at it for ½ minute then close eyes gave no image on the eye but strange to say the reflected light from the water gave strong persistence image, cant the light polarized possibly better photos of weak lighted objects like the moon could be taken by reflection instead of direct.

244

Tube blackened inside 2 beams light right angles - elec + mag fie to affect the liquid
Try spec also shutter - beams X + Rad
X+Z Dif liquids

245

By delicate thermo pile + galv see if phos crystals are higher than temp of the atmosphere

246

Solid Willimite thin foil each side X - Rad Light arc, Hg see if charged foil

247

Foil coated with ignited precipitated Calcium Tungstate Try X + Rad see if charges foil Try Oxalate Lithia with Arc + Hg arc Ditto Balmain

248

Kinetoscope = saturate cloth upon which picture projected with Oxalate Lithia - Try Balmain also this ought to steady result

249

If particles are thrown off end of a wire at any voltage then form salts on polished end of a wire and absorb the projected molecules in reagents giving color - might try intermitting the current + [illegible]

250

In chemical recording points on paper try all metals with dif solutions anode and cathode & develope record with proper reagents giving colored compound. There may be latent images formed

251

wrong for phonofunnel should not parallel the waves -

should be thus

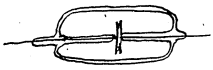
252

try funnel covered over with thin membrane loose - funnel filled with Telurchloride Carbon -

253

try recorder filled with lycopodium

254



X ray tube, 2 plat disks seperated by mica ring .0001 thick – try for phenom.

255

Perhaps there are unknown rays coming from Space or the Ether from some direction Use XYZ Receiver, connect to plates various kinds, move in all directions Use shutters

256

Put up recording instruments at Edison record varying magnetism or body Rapid oscillations, Surround with several layers wire,

257

Get good gold leaf electrometer for Radium

258

Possibly some crystals subjected to intermittent impulse different known rays or stresses will emit XYZ rays —

259

Reduce some CP Tungsten Oxide to metal by H at a white heat Then use it to flash W on Carbon filments by Vacuo process or on asphalt filments, dissolve out asphalt.

260

Measure elec conductivity, expansion by heat, Conductly ditto, Thermo elec Capacity Absorption X ray for deposited metals Electrically

261

In Vacuo use arc + have crater in pole + volatilize different substances to form sheets + Coat walls. possibly make Mica —

262

Perhaps a powerful Voltage ~~with~~ by Condenser discharge into an open Circuit without a current by use of break wheel + discharge at each impulse will throw off from ends of wire molecules, atoms off or ions making luminous Andularia, Elec Calamine, Willimite $CaWO_4$ - $PtBaCy$ Etc.

263

See if ionizing of semi conducting solution is increased by any ord rays or stress singly or in combination,

264

Turning phon cylinders, wax electrifies probably one kind wax make P another kind Negative of two kinds turned off in an electrolite with proper metals for turning tools in say a plating solution would it give current

265

Put motor in vacuum with cylinder of gun cotton + a rubber pressing against it or wheel. Ionize with radium will we get a discharge and light.

266

Cut square off the end of a conifer or Camphor tree limb - cap it partially with an electrode, bury the other pole in earth, Connect battery + cause sap to flow continuously by Osmosis.

267

Ditto instead of electrodes connect glass bottle to end of limb by close fit rubber tube, establish a vacuum + draw sap out of tree by this means

If roots manufacture it, could make them work extra to supply the extra, like a cow whose calf is dead, probably with plenty water and plant food yield could be made enormous. Certainly a tree is more stupid than a cow.

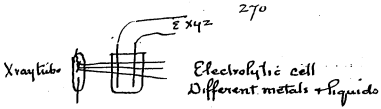
268

Throw acetate of lime or other lime salt solution (which on decompstn by heat swells up and leaves porous lime) upon red hot coals in grate fire to increase radiation & more economical utilization of heat of combustion.

269

Metallic Tungsten for the impact plate of X ray tube, instead of Pt, cant melt it.

270



271

See if magnetic ring, single coil layer gives greater kick in Vacuo (Xray degree) than in air also try it in perfect insulating liquids — also in dark in these liquids for phenom.

272

Calculate out resistence of metals per pound when in form wire — also atomic + Molecular weight, Electrolytic series and other constants.

273

Form a 3 or four in dia ring 1/2 inch dia formed of continuously insulated iron wire — around this wind several layers insulated copper wire — Now measure resistance of the iron wire — magnetized + not mag. Try non magnetic metals as well. also electrolites plating solutions dif electrodes dividing ring

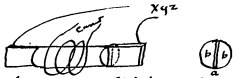
274

Try all iron salts - double salts between poles of 1/4 to 1/2 inch dia ring of permanently magnet. surrounded with a coil thru which alternated sharp front waves pass so as to shake the iron molecule + set up fluorescence or phos.

275

Also try the iron salts in a coil where Leyden jar or wireless discharges pass

276



bb is a regular iron core split in two with a sheet of metal a in between. core surrounded with a coil – DC + alternating + Leyden charges sent

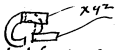
277

Another form.

Core hollow but split in two halfs

278

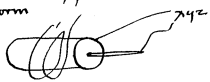
Another form.



In 2 halfs but insulated by air space

279

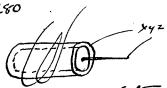
Another form



outside of iron core coated metal, central metal

280

Another form



Metallic shell over core w space between Central rod.

281

If ions of metals are projected in direction of the flow of the current, then interpolate a disk of Ag + Fe facing each other & scraped to a fit, continue the current for many hours + then test the Ag for Fe and Fe for Ag chemically + by spectroscope Try dif metals and high voltage — Leydon

282

See if get Edison effect in an X ray quality of vacuum. If so then a battery current should pass continuously between electrodes, where the P had ultra violet light thrown on it to break down the surface compounds of the electrodes will have to use quartz window. It is this gas layer that is stressed to a contrary voltage equal to impressed voltage that prevents passage of a continuous current thru the ether

243

Perhaps iron can be taken out of tubes or old flat pocket plates by ether alcohol or acetone in which is dissolved HCl gas or acetic, FeCl bring soluable NiCl is not should combn take place with Ni it could be reduced again by Kott.

284

See if a Gladstone Copper Zink couple is magnetic alone, then put in helix, try Kick on Galv. If old theory that a magnet due to innumerable short circuits the Cu Zn Couple has millions + helix ought to position them.

285

Pd Hg Ag Kim

Copper has greatest affinity for Sulphur Mn the least, an alloy of these might have some interesting characteristics. Thallium next [illegible] Zn — [illegible] properties.

286

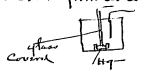
To get data for new electrolite theory use Raulrausche method measuring Res + test no of electrolites which have abnormal solubility curves.

287

Make table of potential gradients of all combustables calling Mg or Ca which is highest 100 — to Zero calling O Zero.

288

Will small surface anode of Hg in KOH act thru Oxide film as a Rectifier



289

Perhaps Nitrides of the non magnetic metals might become magnet in helix sheets of metal hot NH3 passed. Sheets coiled up to form cylinder Also magnetic metals Nitrided might show some phenom.

290

In Vac tube for X ray use iron rod for impact and highly magnetize

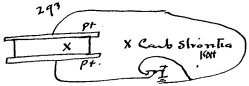
291

In Edison effect tube use central wire of iron highly magnetized possibly magnetized iron is not polarized in Vacuo + connects with the Ether

292

If magnetism is a question of good contact with the ether then other metals in a helix upon which ultra violet light strikes should get magnetic

293



See direction of current in opening

294

Little Etheric coil No 12 wire stranded of No 36 wire and wound 1/4 inch hole to 1½ dia 1/4 inch wide. Put in vacuum equal to X ray. insulate by air space between each coil by bits dialectric. Use revolving break, heavy amperes. air blown spark for Etheric XYZ also with iron in coil made of fine iron wires—

Chemical recording – Wet paper with Potassium Chloride for iron pen. as anode, Develope with FerricyK HS $HSNH_4$

With Cobalt pen use FerricyK AmonSulp Hypochlorite of Na

With Copper pen Use HS, Hypochlorite ferrocy or ferri

With Lead pen as anode HS Hypochlorite Na as cathode see if hydride, Use "

Bismuth pen. as anode. develope by reduction electrolytically.

Arsenic pen HS – when anode, when cathode metal – when anode reduce Electrolytly by current

Silver pen anode, use organic matter + light use paper with Iodide K BrK.

Possibly paper soaked in Co + also Ni Sulphates dried then put in KOH precip the $Co(OH)_2$ in pores and surface of paper washing well then moistening with KOH, will give Co_2O_3 Very black sensitive and permanent.

Neutral K Salt develope by pyrogallic acid cathodic

296

Ferrous silicate powerfully magnetized ought to show some phenomenon with light etc

297

X Bundle copper wires cut lines of force by X wires use other metals than Copper

298

Possibly there are stress lines between Zn and the Oxidizers were moving in + out qwz XYZ. E.

299

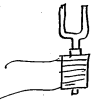
Put bar of iron helix strong current see which end Cools fastest. ditto heat Center long bar see which end heat reaches first, + rises to 200.

300

See if elasticity of iron is diminished by magnetizing in form of a tuning fork

This would probably dampen it.

Try thus



301

Flashing arcs at end of wireless antenae should on account of Ultra violet waves permit of a better contact with the Ether, by breaking down the dielectric polarization at surface of the points, think that is reason why get better results daytime, Light could be few inches from it or arc itself act as point, Possibly Mercury arc in Quartz Case be best,

302

Polarization of battery electrodes should be stopped or changed by Ultra violet light shining on electrodes,

303

Resistance of iron wires should increase on magnetizing to saturation as magnetizm may cause formation iron compounds between its own ions

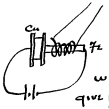
304

Resistance of metals are functions of the free ions and combined ions Al Cu Ag wires have their ions free Whereas Zn zic part are free & part combined with themselves to form Complexes Many such complexes are stable In iron some are free some combined while some of the free ions under Electric stress combine with great facility Al does not hence magnetic power of Iron ? Mn has some free ions which in presence of Sb ions combine with great ease to form Complexes. under electric stress hence magnetic, This theory very fanciful—

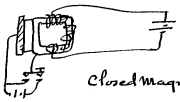
305

Perhaps X Ray would appear at a lower stage of Vacuum if Ultra Violet light through a Quartz window would be thrown on the Electrode,

306



See if condensor with magnetized pole. give phenom or no capacity



Closed Magnet.

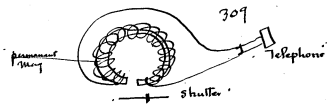
N. Fe Storage 307

See if vion lines discoverable in spectroscope |

308

Little Etheric coil in Vac – probably give with powerful current, which break sufficient capacity to work an X Ray tube

309



310

Ultra violet light strikes end of permanent mag see if disturbs magnetism so shutter action heard in Telephone

Also soft iron magnet with cell + secondary with Telephone in. If there is polarization at surface of the iron its breaking down by Ultra waves should increase magnetism

311

2 Balls in a Vacuum. one aluminum the other lead.– delicately hung one ball shielded from light Use burning glass from lense focus heat on Al. it should be repulsed by the lead. A Coloumb in Vacuo X ray stage ought show pots results with balls of different materials + Rays

382

Can it be that a high temperature world repels in the ether of space low temperature worlds. The Sun repelling the Earth and the Earth repelling against a still lower temperature worlds, between the two now in Equilibrium. The eccentric orbit being due to variation of temp in space. The Center of the Earth is hot, outside surface not so hot result repulsion but sun also repulses - At center of the Earth no repulsion. between it + sun if both are same temp, but outside shell of earth is cool hence is repulsed - therefore Gravity - Every piece of matter Emitting Ether waves say of 100 Energy Repels a body sending out waves of Energy less than 100, hence gravity

of fanciful

313

If a helix stresses on condenser P end of magnet the other end ought not to be compressed. possibly if measured one end would be less dia than the other possibly Ether waves from wire striking iron repulses atoms and thus produces compression & elongation On rings with air gap & only compression on closed rings & this would account for greater work done & given out on closed rings

314

A closed ring immersed in a liquid with sensitive index should show contraction Open gas rings wouldnt except with Extremely sensitive index If this is so the kick or converting capacity of a closed ring should increase by pressure possibly alternations of pressure would generate Currents in the helix around it Could use Explosion in a closed cylinder Containing the ring

315

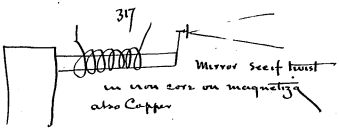
All on the supposition that ether waves or high temperature repulses low temp bodies in the C P Ether. If a body has low specific heat so little internal

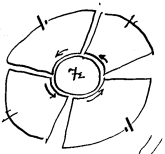
work can be done the repulsion + apparent gravity or weight will be greater, probable reason why bodies low specific heat are generally heavy

316

Chem pure iron, Coat glass plates by Vacuum deposit, also plates so closed ring can be used - should get some good phenom — also Mn Cr Co Ni —
Can get these metals CP from oxides + reduce by H, press into cakes with wire inside marked by glass tube,

317





318

Will iron become magnetic

This is same thing S

319

The most perfect way to measure para diamagnetic Godio is to make rings suspended in Vacuo equal to X ray Vac put 1 or more turns of platinum carrying 3 or more ampere, Balance Res in Bridge & get Kick There will be no diaelectric matter to interfere

320

If Ultra violet light is absorbed by say Mica will it not be deflected or rather reflected very greatly while the other rays pass this would be good way free Ultra of the other waves Find the substance which absorbs Ultra Great & Sets others thru Great & use it for reflector perhaps altered by 2 mag X Rad might alter its reflecting surface

321

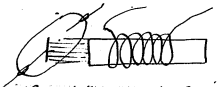
Will a Bismuth ring in Vacuo swing
Turn give a Kick opposite to iron

322

Experiment with Bismuth alloys to
get them more Diamagnetic as iron has
been improved by Silicon

323

If tendency of current around iron to
form endothermic iron aggregates and
absorb energy + Diacholtrics tend to
decompose as Exothermic aggregates
Then possibly Peroxide of Nickel being
Endothermic + a conductor of E
w. magnetic in helix Perhaps
Endothermic diacholtrics might give
interesting results in helix and in
Condensers Ba + Earth Metal peroxides
Acetylide Cu Ag and other Explosives



324

X Ray striking end of iron should give
E in wire and magnetize hardened
Steel, Might use lead shutter + Telephone

325

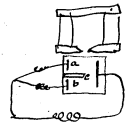
See if alternating magnetic field from poles affect the fluorescing power of crystals
Try the slides in field, with Arc Hg Arc X + Reg light and lightwaves screened off only Ultra red— also in steady magnetic field - also in Wire only field Wheel break— also between condenser plate pump spark point nearly — also slides hot + cold. Also Test not in Mag field but in Electric stress field like a diachetric steady high voltage 1000 Volts.

326

I should have 1000 test cells made up to get high voltage with some current for Experiments Long Tubes 2 Tubes 4 Fe-

327

Try different non conds (18) diachetric rapidly alternated by wireless stress + try if diachetric gives off a ray effecting slides or photo plate.
Ditto metals in a helix with wireless ~~=~~ bunsle wires so no Focaults.



328

Rubber cell Zinc KOH, CuO a is CuO
Electrode b the same exactly equal.
c a rubber partition, now close circuit
move c so current equal both CuO
or vary res in the branches, Now when
Current steady. energize the magnet &
see if ions are deflected to raise current
in a –

329

Put water and other non conducting liquids
in jar. put in electrodes different metals Pt & Zn Sb
Keeping Pt constant & vary the other metals
then use another metal say Al for constant &
vary other metals Use rather high Voltage
now stress Liquid with X Rad Ray Ultra
Hg Monochromatic Light – also when liquid
heated, Also concentrate stress on
one then the other Electrode, then on
liquid only – try phos & fluorescent light
also

If so Oxytube Lillie & Knuckel phenomena

330

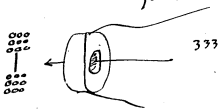
X ray may be short periods of Ultra violet rate of vibration each period only having a few vibrations, (10) Ultra light intermitted — The time which each section Exists is to short for matter to reach a permanent state so as to show ordinary Effects — The first part or appearance of ordinary Ultra probably passes through matter + acts just like X ray but as there are only one series pass and then matter sets up conditions whereby no more passes, We are unable to see 1 series, but with X ray. There are a great number so matter Channel reach a quiescent stage, like the stress in a Condenser or iron in a helix
Try a shutter with holes or slits + intermit Ultra from a Quartz window Hg Arc also Reg arc on opaque matter, with gold leaf & also photo plate, make 100 000 sec if possible, perhaps can produce X ray phenomin, 24" disk 5000 Rev. 1/32 + 1/32 space gives about Million sec
This would be concentrated + should be very sensitive photographically

331

In all exptls heretofore recorded where stresses of various kinds are to be used add Monochromatic light from Hg arc in Chamber with Quartz windows & use with & with siren or Shutter —

332

Use sheet platina heated by current to 600 @ 800 fahr or to such a temp that the Crystals found in Edison Cone will phosphoresce — Then try other Crystals & by regulating Current quantitatively measure relatively also try these in Magnet field, Elec alternated stress field



333

Use helix few turns Copper wire 1/4" hole — Energize with wireless waves — use disks of different transparent Material, liquid, etc for light Expmts & Opaque for X & Rad — Notice any phenom out of ordinary due to this rapid stressing —

334

Intermitting ultra violet waves from Arc light or Hg arc with quartz window should give lots results on matter, If can get ½ million intermittances per second, its only on rise and fall of a stress one gets results from matter.
Try its effects on fluorescent bodies and all slides with crystals, many crystals which will not fluoresce with a single stress, might if alternated + given ½ million per second.
Even heat + E would do something

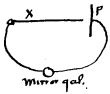
335

Fluorescence is to light what soft iron is to Electricity
Phosphorescence is to light what a permanent mag is to Elec,
With fluorescence the stress goes quick.
" Phos the stress remains
Minute impurities have great effect in increasing fluorescence + Phos, so minute impurities do the same with Iron Manganese Etc
Fe Si Mn Sb-

336

If one X Ray tube gives a photo in one minute with 2 tubes the rays of both striking the plate ½ the time, if so a number of weak ones should produce great fluorescent photo power

337



X magnesium ribbon set on fire. P platina disk — Ultra should make space conduct.

338

f is polished metal c Ultra violet rays exit of rays e h polarizes ray Core has on its end outside of hollow shell a coil wire — use shutter for light.

339

Electricity may be innumerable vortex rings running along the wire, it starts as a wave at right angles (to advancing) to wire, but by friction of matter on 1/2 of the wave + no friction in the ether. these waves turn into vortex rings, This causes channelizing

340

The principle of a megaphone or funnel may be due to formation of vortex rings These tend to continue their direction & would explain many things about sound Ganot says several resonators turned to a certain fork + put on a wheel. will when held in front of the fork box repel the resonators + give revolution and say that no explanation of this action is known — there cannot be with sound waves, but vortex rings can be formed + its this that produce repulsion,

A phono speaker filled with smoke gives rings Try a funnel + smoke + with diaphgn + 100 vibrations seconds, use revolving mirrow + see if 100 smoke rings + if there are then this opens new field — Stresses that travel 1088 ft sec and 30 ft sec

Should be able to transfer smoke from one point to another thus

Dont work good

341

Velocity sound in CO_2 856 ft sec
Air 1093
Hydrogen 4163.

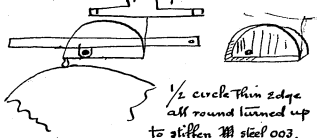
Make funnels with mouth closed by loose thin rubber & displace air by CO_2 - H, Chloroform

342

Rotate a disk of iron 2" dia ½" thick at very high velocity. guard it by a shell over it of different kinds of matter, Then over this delicately suspended dif kinds matter See if any kind of attraction in direction rotation or otherwise, Use lead Ni + other things also stress the rotating body with all the rays. ditto the suspended matter.

343

As the diaphragm of a phono speaker is really a lever 1/8 thick 5/8 long & flexure is enough to give the sound waves. then the sole reason the amplitude of the Dia cannot be increased by leverage not matter how hard the record may be is due to the flexure of the bell lever. To make this so there is practically no flexure make this



Try aluminum 004

344

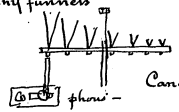
Make a test record of Piccolo too on down to lowest note we use. = then try funnels every length see if on Piccolo a long funnel is any louder than a short one. I think for high notes all lengths give same strength with piccolo but as the note gets lower the volume diminishes — This is due I think to Vortice rings. Think Vortex rings being more local will carry the sound better to

the ear than the sound waves,
hence its probable long slightly taper tube
should be used before reaching funnel
of tone lower than the lowest note.

This long tube will throw <u>all</u> the sound
waves into vortex rings and as these
do not spread much concentrates the
sound, possibly the vortex rings travel
at same velocity as sound but I think
not.

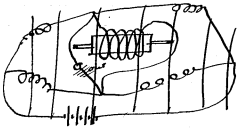
345

For testing funnels rig up a circular wheel
with many funnels

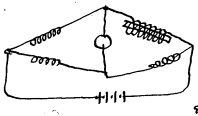


Can change rapidly

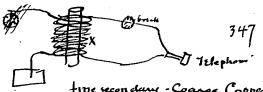
Can decide between a lot of funnels by
one sustained note & continuous rotation



346



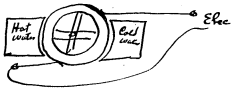
use strong current
Laminated core
rotate at great velocity
8000 min.



347

time secondary - Coarse Copper heat it
+ put one end in water to have heat in one
direction.

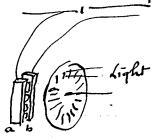
348



Shell of glass coated over with gold + other metals in Vacuo + then both coated
Extra to .00005 2 collector brushes used
unequal heating and reversal should give current, perhaps requires certain metals for collector brushes. Work the Cells very close to ring

349

Iodide Silver is an exception to all bodies
Contracts by heat. interesting material
use it,



350

a b are metals between which are crystals
a Revolving shutter with slots intermits light

when the light strikes crystals work is done whereby they are stressed + fluoresce, some crystals become electric, some phos. If these crystals are provided with metallic armatures the light will be changed to electricity. The more rapid the intermittencies the greater the energy that can be transferred, depending upon the character of the crystal = possibly the armatures must be attached to crystal in certain direction =

x x' rock salt plate
This makes a cell which can be filled + emptied. = To transfer energy its necessary that matter should be intermittently stressed, + here is the condition

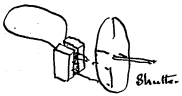
Pyroelectric crystals are hemihedrial
Tourmaline is pyroelec - poles at end.

Tourmaline crystals End on + grounded to fit gold plated lead armatures pressed + held so make contact with all the crystals

Boracite + Silicate Zinc or Siliceous Calamine
Cane Sugar. Brazilian Topaz
Axinite Prehnite Sphene Mesotype
Skolezite Mesolite rhodizite rockcrystal
amethyst Tartaric acid neutral Potassic Tartrate
Rochelle salts
Some crystals not hemihedral are pyro
Sulphur. Sulfate Ammonia Carb Ammon
KChlorate heavy spar Coelestin Calcspar
Fluorspar Sulfate Mg Sulf Mg+Na Beryl.
Iolite diopside vesuvian garnet Analcime
red orpiment Cerusite green vitrol
K Ferrocy Corrosive Sublimate Oxalate ammonia
Citric Acid. Acetate Lead. There is some
doubt about this non hemihedral but
Brewster examined them + found them
pyroelec Hankel reexamined + say none
showed any. that Brewster results
must have been due to <u>other causes</u>
Tourmalin is best = electric polarity is
only shown when temp is <u>either</u>
<u>rising or falling</u> exhibits none when
temp <u>constant</u>. one end becomes P as
it receives heat + N as it loses heat.
pyro is limited bt 10° + 150° Cent.
according to length of crystal.

If we get Elec by working shutter very rapid will have alternations too rapid to use - perhaps Bardy form of Aluminium Rectf. will straighten out - Think pyroelec Crystals are not what is wanted but fluorescent cryst which almost instantly cease fluoresc when light is withdrawn but reach high degree + die quick - perhaps best will be those which no fluor can be detected in Becquerels Phoscope the effect dying out so quick - Perhaps Shutters must be arranged to reverse direction of light thru Crystals. If can get great Conversion then probably refrangibility or rate be so lowered that no light will pass Crystals

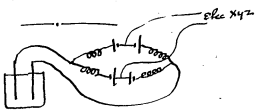
If light produces effects or stresses which lowers its refrangibility, the substance fluoresces, then if the substance could be made to fluoresce by wireless oscillations in helix or as condenser we might possibly get it to fluoresce to rays in Ultra Red



Opaque crystals might work OK say ruby absorb all but red, Alum absorb Red let others Thru = Mica absorb Ultra + give Elec to armatures by intermitting light by shutter.

Perhaps lot fluorescers + Phos. will show self luminous if put in sealed tubs in a liquid in which they are not sol and heated to get rise + fall Temp many crystals that dont fluoresce might be made to by pressure when acted on by rays or amplify those that do Could use Electrolite's. say H_2O with little KOH + Aluminum or Hydrocarbon + little water + Calcium Carbide or Zn + Acid to form gas + get pressure

All crystals in the regular system deform in all directions alike, all others deform in specific directions



Cell with 2 electrodes, bridge rectifier or Emq or wireless receivers as Elec may be in form of rapid oscillations, make chemical reactions in cell - or dissolve salts, hydration - make chem actions disymetric to electrodes, heat one not the other, have reaction take place vicinity one pole, Magnetic field one pole
Also dissimilar metals,
Also KOH Electrolite Pt Elec other
Aluminium - Put in solution
KChlorate which take care H of reaction

It is probable that the Reason low notes are too weak in phono is that the straight part leading to the funnel is too short, [less than the wave length of the low notes] to form a vortex ring and thus get additional volumne from their utilization

If vortex rings diminish volumne and are not utilized then they ought to be suppressed to suppress or diminish power lost
the surface of funnel should be glassy
Japan varnish, + a great amount of experiment done with shape of exit hole between Diaphm + funnel.

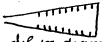
A battery should be a thermo juncture between K ions + Fe electrode [Ni, Fe KOH sta 0] and K ions and oxygen electrode, Nickel metal on both sides The temp ought to rise at the Fe and fall at NiO_2 side = try it

If ions are conductors then really there is no open circuit in a battery, if there is then its at the juncture of the ions and the NiO_2 - even this is a conductor

In a funnel to break big + to form little vortex rings. use disks

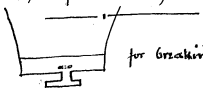
about 2" apart of 1/4" mesh Screen

To increase vortex rings



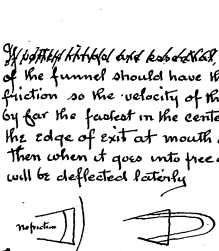
use washers this

Every inch, 1/2 dif in diameter

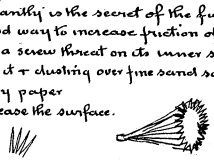


for breaking up vortex.

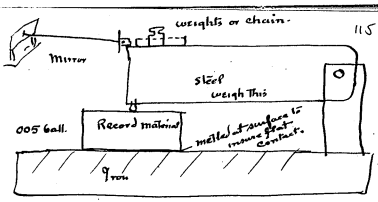
~~[illegible]~~ The inside of the funnel should have the greatest possible friction so the velocity of the wave should be by far the fastest in the center and slowest at the edge of exit at mouth of funnel.
Then when it goes into free air only a portion will be deflected laterally



This apparently is the secret of the funnel.
Perhaps good way to increase friction of funnel be cutting a screw thread on its inner surface or painting it + dusting over fine sand so its like emery paper
Also increase the surface.

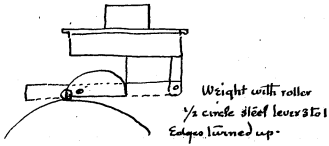


Doubt about this Vortex Theory



Make experiments on elasticity and flowing properties of different waxes used for phono records.

When I return make at once



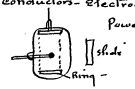
Use standard machine. To get no spring use solid mandrill. record reamed to fit. work out good way adjust relation, had it once have forgotten it — Use new hard record

Try all crystals that will stand it, bring to red heat or higher and drop in ice water to put strains in them = if they are fluorescent notice if weakened or strengthened by this treatment + if non flu are made fluorescent Crystals like Nitrate Uran which dehydrate they can be brot up nearly to the point and chilled

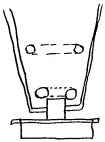
In trying magnetism of alloys and non mag metals use rings heat them up as high as possible and drop in ice water

Make 1/4 recording knife for phono, using track wide enough to get regular depth which is 80/1000? The edges will bring up vibrations not now possible for us to see possibly could use shaving knife as recorder and wider track, We might learn a lot from this.

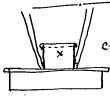
Celluloid, Mica, Glass cell. Small cathode 1/4 dia - large anode 3 or 4 inch - Use plating solutions and regular salts Use heavy currents Try the slides with crystals, all fluorescent, photo for rays from small pole with current in both directions Also send rapid oscillations + reversals - There certainly should be powerful stresses on the small electrode, guard it with glass (ie) connecting wire - have one made only 20/1000 Exposed + others larger
Also in non conductors - Electrodes close together



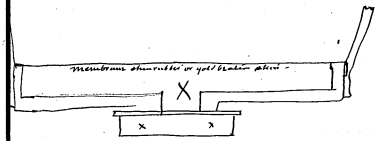
Precipitate Tungstate Ca with 1/8 % + 1% all kinds of other oxides, wash dry and ignite also some chill after igniting see if fluorescence increased with light X or R -



Make funnel this shape to allow vortex not being broken at Exit.

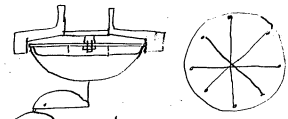


Close X by delicate membrane loose, fill dia chamber with smoke, Lycopodium and turn sound wave into a vortex ring. The solid matter would probably carry more energy. What would probably be better would be this

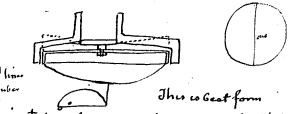


using the heaviest known vapor with or with air in X =

A non flexing diaphragm can be made thus

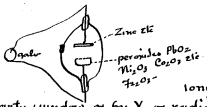


Fastened at the center



This is best form

as the flexing takes place around an edge only 1/8" dia instead of 10 1/8th or 10 times differ it should be very sensitive and make big amplitudes very small diaphrams with the sample amplitude or more to fully make up for loss of area — thus permit lightening the mechanism of Converter. No rubber necessary



Ionize by Ultra thru quartz window or by X or radium.

Investigate the nature of the white Nickel oxide produced by prolonged heating of green hydroxide in strong KOH, it is not active in the battery but it is white, is it anhydrous.- How much O is there in it or is it a compound of NiO with KOH. Try action of strong hot KOH on other hydrated monoxides.

Edison effect

x try Zn & also Ni_2O_3 on center wire.

also Zn at C Ni_2O_3 at X & reverse — also PbO_2 Mg Al.

By making Aluminium condenser with tissue paper moistened with the electrolite could reduce the resistance to practically nothing and thus diminish heat. Several in series or multiple –

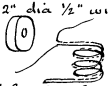
See if the mutograph chalk acts like a rectifier with Aluminium pen and Mandril with Carb Na + other liquids and at same time gives the friction effect.

Iron helix turned out solid

Try various things inside by rapid alternations in a.

Condenser made of Zinc + Silver plated Copper foil, or Al + the latter, see if by changing poles can get dielectric capacity down by coating wires for Telephones. also In Fe –

Wind a helix 2" dia ½" wide ¼ hole



wind this

or non inductively. the difference in velocity should show up— It might even be possible to determine the speed of elec this way— try different things in the helix use 36 @ 38 wire—

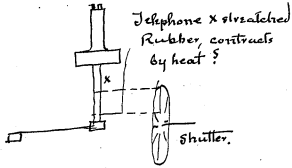
Is the Pupin scheme correct = when I get my artificial cable from Marshall try the magnets across the line and look out for their discharge changing times so they shall be equal + opposite to the section they are to compensate for.

Probably considerable amplitude of the speaker diaphrm is lost by flexing the mandril shaft especially when try increase amplitude by the use of lever, also the record wax as a cylinder flexes—
could stop flexing shaft by dia increase—
But standard beat and thicker walls to mandril shell—

Rig up good apparatus to test flexing of shaft + Records, also see what is natural tone of record + shaft, by bowing etc.

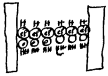
Lead and Bismuth outside Uran + Thoria heaviest metals Ur heaviest metal has lowest specific heat Lithia the highest
Bi Pb 0.0308 Lithium 0.9408.
would be interesting to experiment with. Beryllium + Bi Pb + Ur would be fine as a connection with HHO or OH.

Interesting substance for light and ray Experts, Sulphur, Cubical expansion six times greater than any other substance



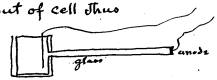
Radicals are the suns of lighter worlds or atoms like Hydrogen.

Further thinking shows hydrate theory electrolysis plausible, but metals +tt. of the molecules set themselves parallel with electrodes a series of rods from P to N poles the center or core formed of Radicals or P elements and circumference of metals +tt, or Neg When a radical combines at one end and metal at other there is a to + fro motion or vibration of these rods. in fusion same action takes place without necessity of water.



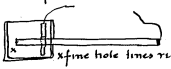
Vortex ring so to speak

Possibly an anode made as a tube 1 ft long or a cathode, insulated on outside or Getter Extending out of cell thus



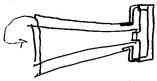
that Cathode or vice versa might show something by flashing or momentary deposits

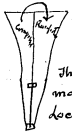
at X a very fine hole
in insulation plate hole too -
S silver plate. deposit Cu Pt or Pb rings etc.



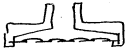
X fine hole times reverse direction

Magnet wound this
way should attract diamag bodies of
put in ring form should produce opposite
effects to reg way —





This is easy
made + should
localize the sound



Valve diaphram.

Flap shellack to dia-

There is not much doubt but what Emg action goes on in the Nife storage Battery its probably increased by fine porosity in the individual particles on discharg pores of FeO tend fill with water and $Ni(OH)_2$ with KOH. Fe tends to dry out and actually have only gas contact, The larger the pores in Active material the better but particles should be fine, anything that would stop action of Chrg would do same thing in Battery!!

Iron ball heat conductor from N to S when ball highly magnetized out to be better, flame from X X' one has molecules set in more favorable condition one way than the other Electricity also

Iron cylinder magnetized by alternating, telephone wire by friction –

If magnetism of iron is a function of variable elasticity make some Cl Co + Ni reduce by H melt in Lime crucible with OxHyD flame test mag Co should be more mag. than Fe.

If magnetic group of metals are magnetic in proportion to their afinity for O. then the grouping should be Ni Co Fe M. or capability of higher oxdtn Scale is still the same in the electrolytic series they stand the same In their afinity for Sulphur their order is Exactly reversed. As to Volitility of their chlorides same but regular from Ni to Mn later weakest.

Their atomic weights still have same order Ni 57 Co 58.88 – (this been disputed) Fe 55.91 Mn 53.90. Cr 52.01 Vanadium 51.25 all the pritox solu NHq salts + NH4

If atomic weights is the reason the scale should be Van Chrom Mn Fe Co Ni. The difficulties of preparing the metals diminish as we descend the scale.
Probability is that its something like the periodic system.

Mn
Co Fe Cr
Ni Va

Mn being the most magnetic
Ni & Vanadium the least. Mn alloys have already been discovered that are quite unmagnetic, Mn is the metal to make discoveries with.

Longitudinal vibrations mechanically executed along a magnet wire should vary the Mag & throw currents into a secondary
Cold should increase magnetism & converting power X ray striking end of magnet in Induction Coil should increase converting Capacity — Dissolving off end by acids should throw oscillations into secondary, but would require a wireless receiver to detect them.

Should increase converting power (10) act act like a magnet to rapid reversals from action of Focaults + juncture action

---

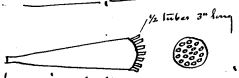
Low gas vacuum down to a point of no electrical carrying from Edison effect when burning at 2 watts candle

Then put in high vacuum prevent loss ~~[illegible]~~ high volts use inner glass bulb which absorbs least heat probably inner globe should be small.

A transformer under hydraulic pressure in oil, should have a much higher converting capacity ~~[illegible]~~ = Also the punched sheets dipped in Kly red hot to ~~[illegible]~~ harden coil + dropped in cold salt water. To cause more work to be done to change its dimensions

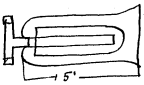
Measure Edison effect with constant amperes on lamp and constantly increasing Vac up to X ray point + beyond Also E effect without Center wire, but with gold or other foil on outside of globe, also keep it cold, also see if detect constant current when large surface (+small) is not in actual contact with the glass, also photo. see if a ray there,

Emq Small Crooks tube thru which inductive charges pass, with & without x contact see if currents pass glass affecting friction — it does

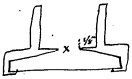


Funnel for giving Vortex sound wave rings

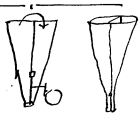
Try different shapes at X



Phonofunnel.

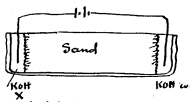


Edges like a razor
Diminish Vortex

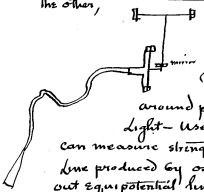


Holes in funnel 1.25 dia
Covered over with thin
cloth + film doped.

X - Did it on dischg 155 mily more than mchg
in KOH 21%
15% NaOH, 145 " " "



How long will it take to detect LiOH by spectroscope in X. also KOH 1 side LiOH the other,



Phonoscope for exploring around phone 60 @ 80 ft beam Light - Use test record same note. can measure strength by width of light line produced by oscillations, Can map out equipotential lines with any given kind of funnel or measure with standard funnel the value of a Reproducer

X Dr Grothe determine % KOH, NaOH, LiOH, in K+NaOH. in charged vrsns and Ni also dischgd, use always same electrodes and after each determination 48 hour soak in large quantity water, then 48 in large quantity of the proper % of Alkali only charge to 85% efficiency = In removing give one quick rinse

Use glass cell and after all the mix has come out that will, change solution put in 200 Mlg Sulphur see if in tests the sulphur bleaches from iron dissolving in the solution.

Set up 4 Nickel tubes with Ferrous Sodium Sulphate iron + 250 Mlg brimstone sulphur put on endurance also another cell with 50 Mlg Sulphur, Important to know how sensitive Iron is to S. Put up Duplicates of regular iron.

Reason why phono reproducer dont throw sound waves out in the air when no funnel is used is that the pressure cant raise sufficiently high to give any heighth to the sound wave, the compression side of dia is so near to the rarification side, wave cannot rise to any heighth, The dia does very little work, it looks as if the free air exits should be at least as long as the wave length of the lowest note used.
for Recording the funnel should be longer for a man than for a woman.

Closing one end of the chamber opposite to the funnel would make the dia a little less sensitive by giving out heat, yet there would be no interference waves mistiating the sounds from the funnel.

Ferrous Na Sulphate iron reduced by H and pressed in a cylinder surrounded by a coil would be good for transforming high frequency Current.

It is evident that the changing rate of $N.(OH)_2$ diminishes very rapidly at a distance from the contact, the result of high resistance of the $N.O_2$. A good distribution is essential between the flake + $N.OH_2$ after oxdtn proceeds into the nickel ox for a certain distance it. Can never go further, other actions come into play—

Have Holland when I return chg + discha 5601-2-3 at constant voltage + put this + chg + discha at constant amp on ohme sheet.

In charging battery - we have concentration voltage, gas voltage, Capillary EMF voltage and gradual rise in res of NiOH on charge and in a measure rise of res of iron on discharg -

When get north, make a test in small req pkg machine with 50 flake 120 green using glass tube + letting down tamper by hand to study segregation of green + flake

Have John Ott change single rod packer so that the relation as to time can be changed + also changed as tube gets fuller Can use packing arm holes

Pass $Ni(OH_2)$ thru 20 fines in thru rolls with enough pressure to flake it Then screen thru 20 + make group with simultaneous feed.

Fusion of Calcium Carbide with anhydrous salts should give some new reactions, fluorescers etc.

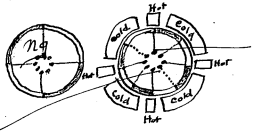
For fluorescers and light by scratching fused silicates of the metals, Silicotungstates

Can crystalize under pressure by using concentrated solutions in one leg of U shaped glass tube, the other leg being filled with Chloride Calcium or Phos Anhydride, The gas pressure got by 2 platt wires and Current or by Calcium Carbide in small glass bulb with fine hole. Could seal on another U tube with Hg + air space the compression of which indicates the pressure. Try Ni Co Fe mix salts thereby in powerful magnetic field

What are products dissolving Silicon Carbide in H Fluoride

See how thin sheets of Ni can be made by the flake process.

Thermo dynamo.



Rotated by power no pull gives alternating Currents (which have strengthen) rotation only for Commutation + alternating the junctures by using ring collectors get alternating currents. Think radiant heat should be used, metal at junctures not more than .0005 thick so reach high temp quickly + lose quickly and also have no amperian or Focault losses can do it thus

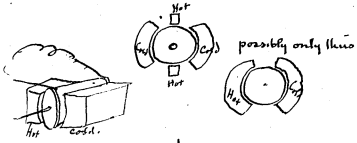
Can coat insulating cylinder with Sections of Bi by vacuum process guarding the alternate sections then guard the Bi + deposit Sb overlapping

For straightening out very high frequency oscillations with Aluminium rectifier use Al salt and deposit the Al_2O_3 by slow current on polished silver, gold, or Speculum metal? or gold on glass by Vacuo process.

Thermo dynamo, plate Cu on glass cylinder .00005 or blush + finish by electrolytic deposit, Then guard each alternate part say ½ inch wide, and sulphurize every alternate section clear through to the glass This is more powerful than Bi-Sb, and think it will have lower resistance, How is Selenides or Tellurides Cu for Thermo

Perhaps a thermodynamo can be made without contacts of different metals by coating steatite or slate cylinder or perhaps non porous lava cylinder or porcelain, or new quartz cylinder with Cu or Au by gold vacuo process and then plate with copper .001 more or less

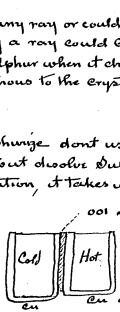
Then sulphurize all except the ends leaving 1/4 inch there for contacts fingers



How much Zinc oxide must be dissolved in KOH to raise the charging voltage above the regular iron charging voltage when it shows considerable rise try the discharge voltage, and see if they agree also Manganeese, want to see if traces appreciably raise the charging voltage without showing correspondently in the discharge voltage

So than any ray or could conditions be made whereby a ray could be made to come off from Sulphur when it changes from the amorphous to the crystaline.

To sulphurize dont use chloride sulphur alone but dissolve Sulphur in it to saturation, it takes up 66% —



Also Amorphous Phos; Metallic form of Phos
ditto Sulphur Selenium —
Sulphides by plating the film + sulphurizing
Selenidz Iel Phos etc
most of these substances conduct and some —
Can be plated on those that cannot can be gold veneo deposited and afterwards Electrolytically deposited.

antimonides, Sulfides Selenides Phosphides Iel of Sb
Thermo

Conductivity for Elec of Sul acid solution lead battery 100 times less than amorph phos and 900 times worse than Tellurium

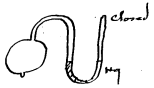
Try metallic form of Selenium for chemical recording points

Tellurium combines with Sulphur by passing HS through alkaline Telluride when dry + is rubbed presents metallic appearance, Use thermodynamo

Phosphorous formed when it is heated under pressure to 580 Cent is better conductor of Elec than amorph Phos. Hittdorf Pogg Anal CXXVI 193.

As we can plate Zinc on magnessium through the layer of oxide of Mg try plating flake by dipping Nickel cylinder in Magnesium salt + flush it with layer oxide by the current wash + plate Ni + so on — dissolve out MgO by acid — perhaps if fails, Alumina or other oxides will work

Try in flake process Zinc instead of Co to form the first layer for chem reduction to Cu



Gas under pressure Chlorine -say- will X ray or Rad change pressure.

Will light reduce endothermic Ni_2O_3 aq to lower stage direct or by aid of organic matter or reducing agents? If so might take place Bichrom in Gelatin process also make good negatives, might be very sensitive
Use glass plate coated mush $Ni(OH)_2$ + use hypo- or a Ni plate coated + peroxid'd by current in KOH, Try X + Rad.
How about $Co(OH)_2$ Perox Ba Ca Sr aq

See K_2H Na_2H. Troost + Hautefeuille
Compt Rendus. lxxviii page 968.

Chlorine hydrate $Cl\ 5H_2O$. try Kohrausch method.

my hydrate theory

If its a conductor see if its as good as if all decomposed to HCl. It forms at 10° Cent try measure res at 5°. gradually reduce Temp and see if conductivity changes as Temp reaches the Temp of hydrate formation also conductivity in falling from 18° to 3°.

Polished aluminium plate in dry Chlorine photo slide sealed, Cl under influence light probably attack Al. at bright spots.

A photo slide plate coated thin porous film, soak in terpentine, put plate in Chlorine the part acted on by light to decomposed probably Can be wet,

Plates coated with Metals in very fine state of division dusted over a sticky surface probably in presence Chlorine dry would be acted on by light,

Lead Bromide insol, does it decomp in K or NaOH,

Perhaps Iodine which conducts Elec slightly Could be used in Thermodynamo or Combined as a solid with metals Iodide Hg Ag Pb Etc between plates

If with several substances dissolved in water varying from good to bad electrolites say 1 gram per 100 cc water of best salt & then in another cell add poorest salt in such quantity & increasing the heat to help solution get the same conductivity what will be the relative amount of the 2 salts in solution might be some interesting results by making curves of a number of salts.

Try Nickel plate between which is a layer .00001 of sulphide of a metal, Hot & Cold water —

Make a collection of colored salts put in Celluloid Cases arrange them around an X ray Tube, Keep it going for a week use another X ray tube and arrange the best fluoresecers & phos ½ of each guarded from ray by thick lead Try for a week or more notice loss or fatigue of crystals, ditto Rad

Make very finely divided Tungsten metal by reducing by H in Quartz tube white heat CP Hydrogen, dip a Carbonized filament of Carbon in asphalt also sugar, dust over + coat filament with Tungsten just as you would graphite it, Carbonize in Hydrogen Ditto try lowest Vanadium Ox, also graphite.—

The definite Antimonides may be good for thermodynamics,

Perhaps sheet made of layers of Copper sulphurized then plated with Antimony then Cu plated and sulphurized or Pb. plated then Sb + so on many layers .00001 thick each would if heated one side + left to radiate in space or water cooled utilize a large amount of the heat as E by the gradual fall of temp through the sheet,

Finely divided Selenium is made by precipn with Sulphurous acid.

Make Sulphides of Phos. there are 6 — for thermo

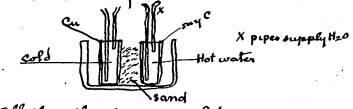
Read up thermo pile expmts Phil mag.

On the Theory of Thermo electricity Kohrausch Pogg Anal Clvi 601 O J Lodge Phil Mag [5] Vol ii 524

Cuprous Chl Lead Ox + PbChl conduct slightly at ordinary temps without decomposition and conductivy increases by heat nearly upto MP. Weideman says they decomp Try Cu + Cu and + cathode dry, hot, Ditto PbCl + Pb + PbO + Pb.

Conductivity of Tellurium
Calling Silver 100 Tellurium after fusion + very slow cooling 0·00435

Following is descending order of conductivity of Chlorides at 18° C. NH_4Cl KCl NaCl LiCl $CaCl_2$ $BaCl_2$ $MgCl_2$ a max conductivity below point of saturation is shown by $CaCl_2$ $MgCl_2$ with the others conducting power increases continuously with Contn in various degrees KCl increasing exactly in proportion to Conc Worst Conducting Solution is $BaCl_2$



All the different plating solutions, having all kinds Gases + radicals, get a Thermo, both poles same metal as in electrolite, to get no polzn If fair can arrange pot hot + cold cells like storage battery Can use Copper Cells + plate metal to be tested on the Cu. Perhaps can use a solution like polybulfid Potash, Oxidize one pole reduce at the other + get no polarization using sand diaphm + reversing Cold + hot at intervals

Ferric + Ferrous salts without deposition of metal if current not too strong.
Can use all kinds of radicals with bases which form ic + ous salts.

Possibly Manganese metal can be deposited from KOH, containing a Manganate or Even a Sulphate if cell kept cold + Magnesium cathode used

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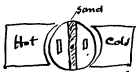


Electrodes Carbon

Ferric + Ferric Chl or Sulfate rotate + Commutate also with ring get AC.

Chemicals for Electrolytic Thermo
Salts of Cerium - Iron - Copper Tin
Mangan Chromium Vanadium, Mercury
Arsenite + Arsenates Sulphides Tellurites etc. id.
Ferro + ferri + Co Mn + other ic + ous Cyanides
Potash Solutions or NaOH KOH, with metals with their oxides same thickness + fineness on both poles
Cu Cu_2O — Fe Fe Reduced by H. + FeO — Bi Bi by H. eg:
nitrate a Nitrite K.

Regular Ni-Fe storage battery irons forming both poles, one charged the other discharged if now put in KOH. one iron heated the other kept cold. The heat will diminish the affinity of O for Fe and cause O to oxidize the cold metallic iron, possibly with iron its just the opposite of this. However this diminution of affinity or its increase by heat accessions should give a current until the the oxide plate is reduced to metal + the metal plate oxidized. Thus with heat we should produce E without it being due to so called thermo current at juncture of metals, By now reversing the heat we get a current in the opp direction, This is only plating O so to speak.
With Copper in KOH could use high temp and strong KOH. CuO not sol then, possibly might go to temp 400 on hot side if cold side kept down to 50.

May not phosphorescence in Alkaline Earth Sulphides be due to change of sulphur therein from amorph to Crystaline the light starting the reaction, which takes months to perfect cryst condition
Selenides of Alk earths should be even better as more energy given off in passing from Amorp to Cryst.

Oxalate of lime and other salts which become electric by friction might if heated with little sulph to make it amorp would become fluor or phos. Try Oxalate Lithia ignited precip Calloy melted (after powdering) with a little S. Try Willemite powdered 200 mesh.

Even phosphides of Ca Sr Ba made with CP Phos so remain white would if sealed up phosphoresce.

In electrolitic Thermo, possibly Sulphides will work better than the oxides in sulphide of an Alkali Selenides phosphides Tellurides, Arsenides Antimonides,

Thermo Table

Bi	+ 25	Pos
Co	9	
Ni	5	
Cu	1	
Iron	5.2	Neg
Red Phos	9.6	
Sb	9.8	
Tellurium	179.9	
Selenium	290.0.	

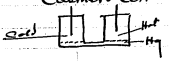
Current go from Bi to Sb
Bi is the Zinc of it

Emf of Bi Cu dif 100° C is from $\frac{1}{100}$ to $\frac{1}{250}$th of 1 Volt.

The alloy I have found is far in excess of this — Becquerel says his CuS artificial has voltage 10 times greater than Bi Cu —

Electrolytic Thermo

Cartmers Cell.



K is transferable ok

Phosphorous acts on Copper sulfate to form a black solid phosphide which is not affected by air or moisture and melts at a red heat,

Cupric Sulfide made by acting on Copper by CS_2 containing dissolved S.

For quickly testing Electrolytic Thermo Couples

Copper anode + Cathode in strong sol Cupro-Cyanide Potassium.
Ferro + Ferricy "
Electrolytic Therm.

Nickel sheet should strip from Aluminium when Ni Nitr Sulfate is used, as Aluminum has an oxide on it. Can deposit a thick Coating of Ox by Current in Sulphate Al Sol & think –

Magnesium anode and cathode in KOH one hot the other cold, may work as simple Thermo, also dissolve all the hydroxides of metals & test,
Aluminum Cathode & anode in Salts

If electrolytic dissociation theory ok Everything in the water is dissociated Except the Excess water, the metals go together & the Radicals together. With Aluminum Anode the radicals are to Complex and large to go through the pores formed, If H can drop its Charge on Reversal on the film why Can't the radical,

Try Telephone transmitter with Becquerels CuS rubbing with antimony, try direct + in primary –

If a good thermo say CuS. Touches a hot body get its highest voltage at moment of contact or do voltage rise slowly important to determine this point

Electrolytic Thermo.

Cu plates $CuCl$, both poles hot + Cold probably one reduced to Cu other to $CuCl_2$ – but this is soluable so if start Cu fine divided & $CuCl$ then it would reduce $CuCl$ to Cu_2 form $CuCl$ at other pole

Ditto Cu plates finely divided Ferrocyanide Copper Ferrocy solutions –

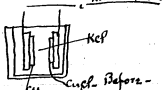
Ditto Cop electrodes lowest oxides Vanadium

Bismuth and Antimony powders pressed hydraulic in a ring wound with wire, should give good kick as internal circuits are formed a la thermopile. Also the 2 oxides reduced by hydrogen, this might be better possibly use alloy Bi 88 for a ring

Cellulose filments dipped in Chl Tungsten after being semi carbd

Fluorspar Coff becomes phosphorescent by heat, possibly its this that gives light when Edison ore is heated, if its apatite, this has fluorine in it. See effect of stressing it by Elec oscillations + heating at same time

can make by precipitation, forms microscopic crystals



Before - after the Cl transformed no energy absorbed in Electrolysis - Thermoelectrolytic Chl Br Iod acid radicals + everything which has mutual reduced + salt produced combustible in electrolyte

Try all the crystal slides by flash light Mg powder, use cartridges so can make quantative measurements, in addition to Hg + Carbon arc. + ditto fed with metals and salts & oxides etc

Mould cylinder of Oxychloride Magnesia boil out MgCl. leaving porous MgO. for EMG Try OxyCl Zinc. etc

Wet chalk Emg with LiOH, KOH, Rub Caesium Mhy — When get cylinder of inert matter to acids Try all the salts + acids —

Make some precipitated Zinc sulfides for Fluorescing White Zinc Sulfide insol in Alkali Zinc Phosphide, is metallic like. Thermo,

By using lead cell and chloride of lead hot one side cold + reversing, could take advantage of insol in cold + sol in hot water of PbCl. the current reducing the PbCl to metal at cold + vice versa

PbO_2 dissolves in moderately conc phosphoric acid, its an oxidizing liquid, only decomp on boiling — Thermoelectrolite.

Lead Electrodes, Sulphate lead Electrolite H_2SO_4
Thermo one hot other Cold

There are lead sulphides lower than Galena PbS
Pb_4S Pb_2S made by fusing finely powdered galena with metallic lead, 100 galena 84 Pb gives Pb_4S heat in well closed charcoal crucible if done in earthenware Crucible Pb_2S is formed

Copper pen, chemical recording paper
Hydride of Copper forms on Cathode develope by H_2S, or Hypochlorite Na.

Thermo — Cu poles Cu_2S on one CuS on Cu on other on heat CuS decomp to Cu_2S.

Electrolitic Thermo H_2SO_4 Antimony High + low oxdtn, neither ox sol in H_2SO_4

Vanadium Tetrasulphide V_2S_4 Black insol alkalis or HCl H_2SO_4 also hydrated salt on precipitation is brown but goes black not decomposing on drying Unites with basic metallic sulphides forming sulfovanadites also V_2S_5 black stable form sulfovanadates Above for Electrolytic Thermo.

Sulphide iron, mequetite may give rings for high counting of rapid oscillations no faults on long iron circuits to delay

Precipitated Magnetic ox filament it would be high resistance

As Aluminium electrodes in Vacuo tubes dont carry either oxide or metal it should act as a rectifier for wireless Eng other receivers which may want direct current use in that stage of Vac in which discharges take place with lowest voltage.

Theory April 2 1907. 117

Battery Zn KOH NiO_2 circuit X. gives off heat and if radiating surface is small enough, gives both heat and light from the internal combination of the Oxygen with the Zinc, So far as the senses are concerned the results of combn of O with Zn to give heat cannot be determind within the cell but we perceive that the heat is given off by the wire.

2 Now the internal combination of the O + Zn does not take place when the connecting wire is broken it only takes place when the circuit of metal is complete connecting the O with the Zn

3 When the circuit is open and has never been closed there was a slight combination of O with Zn and this caused waves in the ether to pass along the wire and stress the air to the extent of the pressure due to combn of O with Zn. hence a momentary current passed but almost instantly ceased as the air has a stress limit The air is stressed like the glass of a Leyden jar,

4th = Metals cannot be stressed to a limit hence when the circuit is closed, continuous combination of the O with the Zn takes place or The ether waves generated by the combination of Billions of atoms Zn O per second pass over the wire the outside air still being stressed (12) its initial stress, is static,

5 Now the atoms of the metal conductor are probably locked to the ether so that there is resistance offered to their passage, and the rate of vibration is probably enormously diminished below light waves, by atomic inertia Either the friction produced by the vibration of the atoms causes the whole of the combn energy of the O+Zn to be given off to the external ether as heat waves therein - or the motion of the slower moving atoms or waves send out heat waves in the free ether in fact all the energy of ZnO is lost in the ether of space as heat, radiant or converted

6 If Zn is burned in air we get heat waves directly to the ether because the combination takes place in air which is a medium which has a stress limit, hence no channelization or current of E can take place all that might possibly show electricity would be the stress between ZnO &c.

7 But if the combination can take place between O & Zn under conditions or in a medium which has no stress limit, then the results of combn are transferable along this non-stressable Cannalization, and continuous combn takes place.

8 Regarding the nature of the waves passing around the circuit, its probable that they are of great amplitude and length, travelling in the wire and Ether and extending out considerable distances from the wire into the free ether.
Or there are bunches of waves in the wire and free external Ether, gradually weaking in amplide at a distance

9 As the air is continuously stressed while current is passing and as free Ether offers no resistance to the waves no energy as heat is lost in that part of the energy which is conveyed by the free Ether, the whole loss is due to the metal atoms vibrating with the Ether

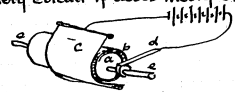
10.

The reason why a pound of one metal drawn into wire will conduct the current say 3 times further than a pound of another metal drawn into wire both receiving or rather losing the same total energy, is probably due to the molecular arrangement of the atoms and not to the atoms themselves also perhaps partly to Crystallographic condition, as we know annealing greatly effects conductivity - also impurities in small quantity dissolved in the metal. possibly the ion theory a la Rudium may account for the difference partly as metals of high atomic weight are the poorest conductors per pound of wire - in any event the poor conductivity seems to be due to internal friction or vibration of the atom communicating heat waves to the external Ether and thus transfer the Zn-O Energy to ~~space~~ outside matter.

11 The only way we can get this
Zero Energy to perform mechanical
work is to connect to the wire of
the circuit some kind of matter which
can be stressed to a limit by ether
waves. and so arranging this matter
so that as fast as one portion of it
under the influence of the ether
is stressed nearly to its limit it is
withdrawn from the stressing action
and a fresh lot of the same matter
brought but within the influence to be stressed
in the meantime the 1st portion is
unstressed, By this means by using
matter half of which is being stressed
nearly to its limit while the other
half is losing it - we have a combination
of matter with a stress limit
acting as if it had no limit hence
we have the conditions for a
continuous current. If the effect this matter
is iron, the conditions a motor
The act of rotation prevents the total
iron from having a stress limit
if this motor runs a dynamo we get
current transferred

12 It does not matter what the nature of the matter is, iron or X as long as it can be stressed by ether waves and has a limit it can transfer energy either alternating or continuous, the later if a battery current, and this through non conductors.

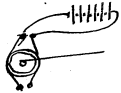
13 for instance this device should permit a continuous current to flow in a battery circuit if above theory ok



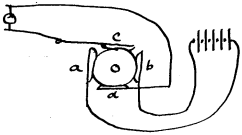
a is metallic drum coated with say thin layer gutta percha e is the shaft whereby drum is rotated. Rubbing on the gutta surface is a sheet of metal foil the battery is connected to c + commutator or connector d. On ~~wheel~~ on

rotating the drum half of the gutta is stressed and as fast as parts pass from under the foil to be unstressed fresh unstressed matter passes under it. If this device is faulty by reason that the gutta passing out of the influence of the drum + foil does not unstress itself perhaps following change will improve it

14

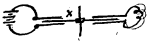


This will give a current in the circuit I think and tend to rotate as a motor. Of course this is very defective as we have rubbing friction it is possible it can be improved thus.



If drum rotated a continuous current should pass thru a b + the gutta film and metallic drum – This will give a continuous current into c.d. by the unstressing of the gutta
a further improvement would be to not have the foils actually touch the gutta but kept in very close proximity then the loss due to air space could be made up by rapid rotation of the cylinder

16-

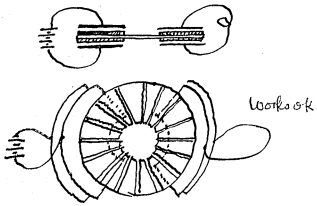


Disc form is probably better will this act as a motor x mica or quitta, -
Tried this for telephone its OK

17

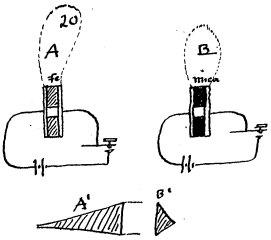
No continuous current can be obtained from a battery where the liquid is composed entirely of compounds because the slight initial combustion would instantly stress them to the limit and produce insulation or contrary stress voltage exactly equal to the combustion voltage + balance = To have continuous current there must be free elementary atoms in the liquid which have no stress limit. This would show that the disassociation ionic theory is correct,

Another form of 16 thus



19

Now comes the mystery of magnetism why does iron for instance have a stress limit, when subjected to energy in form of waves in the Ether, and why does it act just the opposite to compound matter when in the act of being stressed



On closing the circuit of A a wave of current proceeds in the circuit represented by A' becoming constant when the iron has reached its stress limit for that particular current. The stress wave opposing the current wave in the circuit

In the case of B the opposite action takes place and the stress is of the opposite character.

20.

I understand iron when it expands diminishes in capacity to bring stressed but compounds or diaelectrics act just the opposite. Therefore.

21

The iron of A contracts when bring stressed while the Mica Expands.

22

Why does the iron contract. Is iron a compound ion, two iron ions combined together which are decomposed by the energy of the ether waves and thus favor contraction, work being expended in decomposition, ~~the result~~ the normal state being combination or is it just the opposite the normal state being free and the effect of the ether waves is to bring about combination and thus prevent further conduction of ether waves, limiting the stress.

23

In re 21 Iron may expand (in relation to the ether waves) in one direction and contract in another and the may be so with diaelectrics

24

Iron expanding at right angles to the current, and diaelectrics in the direction of the current, contracting
however this expansion of iron at right angles and contraction in the direction of current might still be due to ionic compounds of iron with iron.

25

Possibly the phenomenon that the ether waves cause a deformation of the mass of the iron in a direction depending on the advance of the wave, and this deformation is resisted by the cohesiveness of the atoms molecules or crystals of the iron Molecules or crystals of iron would probably have no polarity, being ionic or elements, where a diaelectric or compound, formed of systems of two different kinds of elements would already have polarity. In the case of iron the polarity is created only by the ether waves, and thus we

26

have an instance of polarized ions combined with each other in contradistinction to a polarized non disassociated diaelectric

27

If this is so then other ions of two dissimilar elements dissolved one into the other as an alloy might form a polarized ionic system and become magnetic – (12) the 2 elements although an alloy and forming a single substance apparently both substances disassociated or in the ionic condition become associated to a compound under the influence of the ether waves and thus have a stress limit –
We have such an alloy in Mn Sb. which I understand is more magnetic than Nickel.

2

Therefore, Magnetizable Bodies are masses of dissociated ions of an element or elements all the atoms of which are in the ionic condition, all held together in an elastic body having cohesion, and that the passage of an electric waves in the vicinity of this body causes association and a polarized condition of ions longer ionic, hence acquiring a stress limit like other non dissociated compounds, and upon cessation of the electric waves dissociate automatically into ions, Except in case where the compound is constrained and prevented from dissociating by increased cohesion due to hardening or the Carbon entering into the compound preventing its auto dissociation, as is the case with steel

Why do magnetic lines pass freely thru
diaelectrics without scarcely doing any
work, meeting practically no resistance
Are they in motion or are they fixed
and static, simply a stress in the ether
without vibration or undulations of any
kind or requiring any energy to maintain
them
An electric charge or stress on a ball
in high vacuo will retain its stress for
weeks and immitate the lines we
see thrown out by a magnet as evidenced
by filings. Bodies can be brought near
and charged by induction and then
removed and discharged requiring
off energy. This can be done many times
and yet the ball in vacuo apparently
loses none of its charge. The energy
comes from the muscle power of the
Experimenter
Its the same with a permanent magnet
any number of additional magnets
can be charged and removed
without loss of magnetism in the
first magnet. This energy comes from
the Experimenter

It took more power to pull the magnet away than the unmagnetized gave when brot to it, the surplus energy being supplied by the Experimtr.

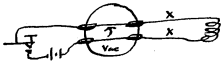
I think it pretty clear that magnetic lines are fixed and static as they are in too close connection with matter not to lose energy if they were moving — Magnetism is the polarization of ionic compounds formed + polarized by energy from waves in the ether,

It seems to me a condenser charge is simply a short circuit through the ether of very much lower resistance than a metallic circuit but as the diaelectric compounds get polarized they no longer permit the current to pass through the ether
The energy lost in the Etheric short circuit is entirely lost and not returnable to the circuit but that

Portion of the current which went to stress the dielectric is returned to the circuit on discharging -
This is probably the reason why wireless requires rapid oscillation so as to make dielectric resistance diminish & get longer contact with the ether, allowing a large supply to enter.
Ultra violet light shining on the end of mast wire or a flaming or the arc in Quartz should greatly assist in making contact with the Ether at both ends —

If it were possible to prevent and keep all stressible matter away from a metallic circuit there could be no canalization of electricity It would not exist, as for instance in a battery the Combustion effects would go direct to the ether like a candle burning the ether would have no resistance no drop to reduce temperatures due to the combn of say Zn O and the temp would reach very high

If part of a circuit was to be put in a vacuum thus.



And the vacuum made so there was no residual compounds of any kind therein no current would ever pass to x x it would be short circuited by the ether or ions in the residual.
If there was a slight layer of molecules on the wire no current would pass. they would stress, but if these were decomposed to ions by radium for instance we should then have perfect conduction,

To return to the magnet. In the passage of a ½ part of a perfect loop of copper wire through a gap of a ring magnet The current generated forms lines which reading on the lines of the,

magnet, distort them, and produce a resultant group of lines which cause a twist in one direction when passing in ½ of the loop, and a twist in the opposite direction on passing out

This does not explain why one leg of the loop always has the current circulating around the loop right hand on passing in and left hand on passing out.
The loop is perfectly uniform, the same in every point, What gives direction to the current?

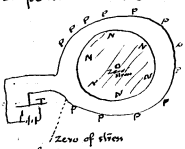
The only thing I can find that is not symetrical in the operations is that one side of the wire is passing through stronger fields than the other side as it passes in I refer to a single wire, there must be a local flow of current a la Foucault
This might with the lines it produces give the initial start in the right

direction, because on passing out the opposite condition obtains, this initial action is of course over powered by the main current which continues in the right direction notwithstanding the original focault ceases at the maximum density of lines & is even reversed before it is within the magnetic loop.

It is impossible to charge P & N a metal. metals have free ions, except by continuously supplying energy to keep the charges static so to speak. Like a battery and an open circuit

May not the explanation of magnetism being dependant on the ~~ampere~~ current ~~turns~~ and nothing ~~else~~ be due to the fact that a single turn around a bar of iron the action could be explained by supposing the ampere turn was positive or high potential, on starting the current, the iron would be charged N or P. cant say which just now. all around the outer part falling to zero stress

or potential at the center of the bar

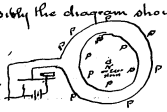


until the iron had need full stress due to the current unit amp turn,

Static action or stress in the dielectric would occur but it would be masked by the greater capacity for stress of the iron owing to its being a conductor or ionic

This dont explain polarity of the iron which is apparently at right angle to the wire.

Possibly the diagram should be thus



As magnetism is not changed by drop of voltage in the wire of the ampere turn the stresses in the iron would be symetrical.

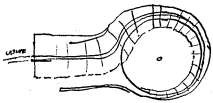
The constancy of this stress requires a continuous supply of energy - or rather pressure.

Regarding the direction of the poles in the iron, it may be due to the little circuits with current in the iron which are positioned by the stress and set at right angles to the wire turn, a la the old theory I cannot believe there are currents in the iron, if it was so the local action currents of Gladstones Copper Zinc couple ought to become magnetic in an energized helix

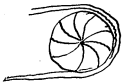
Certainly the current action itself causes the iron to throw out lines of stress which are the same or opposite of the wire stress lines + thus tend to oppose the passage of the Current or wave front + this continues until the stress due to that particular current has reached its limit

Perhaps the wave over the Wire passes thus

If wound around a magnet or iron it may be thus

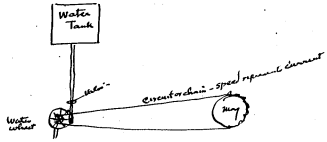


This may give a twist to the core the center being fulcrum or position of no twist to molecules and circumference greatest twist thus



The trouble with this device is that if E was matter it would return it over the circuit in the wrong direction when the Torque sprung back to normal.
if there was a twist against the current then the direction would be ok.
when battery disconnected,

A maget acts like a fly wheel.



On account of inertia Mag starts slow after water ~~[illegible]~~ stopped the mag gives up its acquired energy

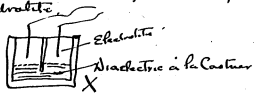
Cont do it May 20 1907

Have Dally try to seal quartz with glass, to get Quartz windows in Vac chambers.

Try in tube with Nickel flake precipitated Cupric hydroxide it might possibly go to CuO_2 & hold there if kept cold with Ice & hot on other pole — Thermo Elec

Thermo elec — Perhaps may be bothered by thermo Current at junctions where I use 2 liquids. Can probably nullify it or neutralize it by 3rd liquid & 2 sand partitions.

to bottom in contact with one pole, other pole in an electrolite



Might get some interesting results in X phenomenon desired in the insulating.

fluid + neutral KCl NaCl etc on electrolysis show red at junctures - or a heavy condenser discharge. This would show the primary reactions of electrolysis. If the radical Dry Ethyl was soluable in the non electrolite we might in this way electrolize - Everything + have a new means of investigating - With Tetrachl Carbon might transfer Cl & substitute K.
It may be possible that reason certain liquids do not conduct is that they cannot make molecular transfers between a solid and a liquid but can between liquids & liquid + above instrument may be important. Try Ether + see if Chlorides which are sol therein will allow transfer under above conditions.

Its possible Thermo Electric currents has something to do with Allotrophy changing from Amorp to Crystaline + that all thermo couples will show fatigue at as the reaction approaches a finish Its like fatigue or end of the stress in X ray fluorescers, X ray causes white phos to change to red, Sb from amorp to Crystaline Explosively - if this was Exceedingly slow reaction would get a Current for weeks.

Kinetoscope with fluorescent Oxalate Lithia use Quartz lense for projecting to get Ultra violet waves

There is no reason if can get rid of the Coarse grained Emulsion why Kineto pictures cant be taken 1/8 square inch of 1/2"

Possibly can take 2 Reg Ni Storage cells oppose them heat one, other cold, + cause heat to give a surplus current + by reversing heat keep them continuously charged - Perhaps Ni Storage is not best Combn Crova did this on something Compt Rendus lxviii 440.

Test organic matter alkalis, just tint with permanganate K neutral, it will turn green if any reducing agent in it might adopt this test.

Momentary contact of one metal with another, one hot the other cold, see what diference in Volts, amperes, it makes if cleaned + used instantly, also try putting films on end of metal of extreme thinness by immersing into Electrolytic Cell + c Coung Current for fraction of seconds,

In making artificial Sulfide Copper make every proportion of S to Cu until it ceases to conduct hot ditto Se Te P. Sb

Thermo contact Electricity after all may be analagous to Cementation or slow combination between solids say CuS + Cu heat gradually cause S to pass into the metallic copper secured to the end of the CuS of Becquerel + thus a slow reduction of CuS to Cu_2S takes place + gives the Current, I understand all thermos show fatigue + hence are not constant or Commercial, Becquerels pile should probably have been constructed so it could have been reversed once a week + if the Cu_2S would go to CuS under action of the Current the pile would be healthy – Think a pile or Cell of above principal is ok Can be constructed where action is very rapid + powerful + Reversable permitting transfer heat to Elec economically

See if LiOH, Cleans Nickel which is yellow from action in KOH, also if dissolves $Ni(OH)_2$
LiOH alone cleans it pretty good

Lithium is a metal with which very little seems to have been done compared to K + Na. Yet it is wonderful for being so close to H in atomic w. H being the active member of acids + almost everything, H_2O - etc. Experiments with lithia ought to show something good in physical electrolytes -

See if $Ni(OH)_2$ dehydrated to white NiO by hot 33% KOH or stronger is active in LiOH - its not in KOH, if active by LiOH, then show delight of $NiOH_3$ is trouble with battery.

Thermoelectrolytic Take 2 Fe battery test irons discharge to Zero. Heat one this may bring out the latent capacity + charge the other.

See if LiOH dissolves ferrous or ferric oxides also stuff deposited on Ni or Pt strips when electrolyzing KOH. also Pt strip and iron test pocket, also if it cleans old Ni pockets,

Can prove if Becquerels Cub gradually detorates by use one element on a steam pipe other water pipe, measure V + Ct weekly

Castner KS both sides CS_2 in bottom in which little S dis by one side KOH other KS see if transfer possible

Thallium or Manganese has very little afinity for S. Hg + Cu great afinity use KS in KOH, and see if can get storage — possibly can find an endothermic Bi or tri sulphide, this would be good.

In the Cellulose in Chl Zn for filaments incorporate recovered long well mixed Nickel Mix graphite, then squirt + make long filament + probably flash by making it 002 could probably get it 2 ft long + thus diminish falling Emf per unit — + stop carrying + blackening

In using Magnesium powder to flash in room with slides containing crystals. Note fluorescence and they make better flashes with different oxides of metals incorporated with the Magnesium powder to see if there are specific fluorescence.

See if fluorescence act same under different liquids also under pressure

Make lot of Lithia salts analogous to Oxalate for fluorescence — Benzoate Lithia, also Rare + heavy metals with Lithia,

Make some $N_2(OH)_2$ by precipitating the Sulphate by $LiOH$. make test group 1/2 wash not filtered dried low heat,

See if Zinc plates over good on Magnesium Cathode in $LiOH$ alone also 15% $NaOH$, 8% $LiOH$,

See how Zinc in 21% Kott, with Silicate Soda Great proportion plates over on Magnesium Electrode,

See if Mosaic gold Sulphide tin will or can be substituted for Nickel to get flake

Emq- Cylinders of Sulphides - Mmi B; pens metals, & other Sulphides
Ditto Cylinders Selenium, Selenides
Tellurium, Tellurides Arsenic
Arsenides, Phosphorous (Red)
Phosphides, Antimonides, Vanadium
Oxides alloys,

Photo through a group of crystals of all Hydes all which absorb
Light = ditto in power field of
Microscope = Beam light right angles
Ditto flash light / Hg arc thru
Quartz - Elec Arc X ray at
same time stressing Crystals

See if Emq is effected by temperature

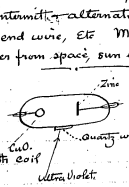
Moisten Emq cylinders with KOH, NaOH, LiOH, containing metals held in solution by Citric acid — also Cyanide

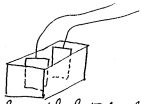
Try Acetone, in Emq d

Try also Tartaric acid to hold oxides in KOH,

Try Lime Ba + Sr water,

Connect to earth a wire then at end use Vac X ray stage and higher, Hg Arc Quartz window + connect with Ether, Use XYZ + other receivers intermitt + alternate connections magnetize end wire, Etc May be oscillations in the Ether from space, sun spots etc.





Cell with alum-alf electrodes, plain + with oxides on
Heat rays absorbed to to E waves.

Transparent Crystals containing Silver salt as
an ingredient fluorescor

Crystalize in Vacuo using H_2SO_4 as H_2O
absorber

If LiOH takes out Silica from $NiOH_2$ pole wash
it out of regular $NiOH_2$ by percolating hot
use ½ wash not filt dried low heat then drop
make a test group of cells —

Dr Grothe assay liquid ~~out~~ from bad cells
then liquid with LiOH which has been regenerated
to see what LiOH removes.

Get some large record Cook's Special to
lay flat.

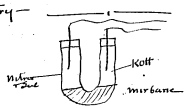
Found iron a powder must avoid like all other iron — Then was Fe with Cu + Reversed many times

When I went South left 3 Fe's that were reversed long time, get them, examine, then D.T.A. for Cu thy Fe —

Metallic Lithium + Bismuth or other metal having lowest specific heat in vacuo, ought to give good thermo, using radiation only

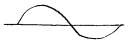
See if XYZ at recalescent point of iron vibrate heat above + below the point Barrett's phenom —

Some of the rings of alloys to test induction kick — try at different temp also heated nearly to M.P. + throw into cold brine to chill then try —



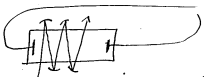
Should conduct E or Energy

To change alternating currents use Kott cell with plates plated with Cobalt, 200 or more plates in E 18.

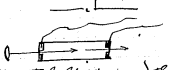


Before

2 Electrolites, porous partition - heat junction



Reflect radiant heat + light across electrolite get fall same as different metals, plain + plating solutions Hg arc, sun - Carbon arc



Tube, alternate light 1st one end then the other

alum.

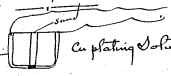
some solution, absorb rays above red which are reducing mixed with non polar + plating solutions.

Nickel plating solution, silent discharge plate films on surface of liquid

Try get smoke or Vortex rings on throwing coal in Cement Kilns

x non cond very fine hole thru it polished Ag plate, Cu etc

plating solution see if plate circles on mounting currents



Cu plating solution

Change earth plate from one to the other

See if Edison effect is changed by a magnet absorb Hg by Al + see if diminished, try iodine, Excess Hg, Tin amalgam

Well prices

3"	3.5"	4"	4.5"	5"	[illegible]
1.00.	1.25"	1.50	1.65	2.5	[illegible]

Notebook, N-06-11-18

This notebook covers the periods April-October 1907 and February-April 1920. All entries are by Edison. The book contains notes and drawings regarding projects to be undertaken and hypotheses to be tested, along with other theoretical speculation pertaining to electricity, physics, and cosmology. Included are entries relating to x-rays and "xyz rays," the electromotograph, storage batteries, and incandescent lamps. There is scattered material dealing with improvements to the phonograph and kinetoscope, including a one-page entry about a proposed "kinetophonograph," as well as a brief notation detailing a high-voltage direct current dynamo. The book appears to have been used primarily at Fort Myers, Florida. At the end of the book, Edison's youngest son, Theodore, signed his name in November 1906. The front cover is labeled "Ideas Theory." The book contains 408 numbered pages; many pages are blank.

April 5 1907

Disassociation Theory of Electrolytes

Let us assume that the above theory is incorrect, the true explanation is that conduction is due to the destruction of a portion of the limiting stress capacity of the electrolyte and providing molecules which for conducting are structurally ionic, or non polarizable.

Take for instance CP water, it has a stress limit, the whole of it because the exterior surface of the molecule has one portion a combustable of high potential, and another part non combustable or low potential

Now when a wave attempts to pass thru it, the molecules polarize and position themselves to prevent the passage of the current except the first rush which supplies energy of positioning formation of the stress, which is ordinarily called polyn of the electrodes.

If we now put K_2O in the water there is hydration, or combination of the H_2O with the K_2O. to form a new molecule,

Thus K_2O one water hydrate

3 water hydrate

This new molecule has all the high potential or combustable atoms on the exterior while the zero potential or non-combustables are at the center

Thus we have a molecule, unstressible becomes incapable of being positioned by the wave and can conduct like a metal, the equivalent to the ions of Arhenius

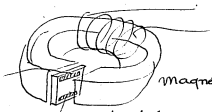
The end reactions with the Nickel Iron Accumulator is transfering O from one pole to the other = I do not mean to say that the O actually travels from the Fe across the liquid to the Nickel but the wave passes over the bridge of conducting ions, and the actions are local. at each pole, just as if a metal rod reached across the liquid
The non ionic water however passes O from pole to pole by molecular exchanges No weighable matter shuttles across. otherwise a battery one million miles between the electrodes would actually require projection over this space of weighable matter which is absurd.

Migration of the molecules is a secondary phenomenon, slowly taking place.

No salt dissolved in water will permit the resulting liquid to conduct without the salt combines with water to form a hydrate, and proms a

structural ion, the more perfect the ionic structure the better will the solution conduct any asymetry in the outer shell of the molecule and not wholly combustable will result in slight positioning, formation of limiting stresses, or by working of mass action very few molecules are hydrated to an ionic state,

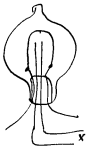
The more dilute the water solution is the greater the mass action compelling hydrate, hence the greater proportionate conductivity



Perpindicular cell between poles heat and disturb resistance electrostatic lines they want to form but must work against repellant force of the Magnetic Force plating Dots etc

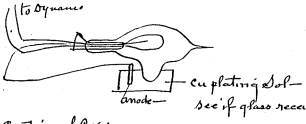
Copper wire volute

Try alternating Cts



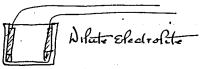
Edison effect

see if battery current pass across X.



Coating of Copper

Try a group of test cells ½ wash with plunger fitted as close as practicable



projection of ion should hit N or P pole & give a ray— Use celluloid cell cathode & anode forming part of the cell.
Very Dilute Solutions, Try Al + other metals & of ions—

Try stunts with protoxide of iron & Silica (Silicate ferrous) also Manganous Silicate — in helix & other conditions

Potassium Oxide reduced by Hydrogen at low heat whereas Li_2O not reduced by H or CO,

Heat of formation Li_2O	140 000	$+ H_2O$ 13000	Hydrate 26000
Na_2O	105 000	25000	55000
K_2O	97 000	42000	67000

Solubility Li_2CO_3 100 pts H_2O dissolve at

0° C	1.539
10° C	1 406
20	1 329
50	1,181

Try crater arc light carbon Bort mixed with all kinds metals metaloids & other Compounds not acting to destroy to see if can be changed to Carbonado, Did goes to Graphite —

Self frothing of KOH is stopped by adding Lithia —

Make emulsion of photo silver salts in collodion containing some reducing agent equally as strong as gelatin but not on the collodion + coat film stick + print from Kerreto negatives to get film wont flake off –

Historical Survey of Crystallo Lumineccence
Etc 800 substances show 30% give light when crystals are crushed.
Zeit physical chem – 1905 Vol 53. 1.

Try painting over dry photo plate Oxalate Lithia Balmain, etc To render slow negatives as sensitive as fast ones, so both will get same chance –
Try Quartz lenses,

Ask Bragher Pittsburgh for Catalogue,

iron coil around see if alternations will change friction when clip metals + o-bottomen ones

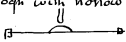
Historical survey of Crystallo luminescience of 800 substances 30% show light when crystals are crushed.

Zeit Physical Chem 1905 Vol 53 p 1 get.

Balmain Luminous paint also oxalate Lithia on dry plate negative permit more rapid exposure

Atlantic Cable or at least South Amer Cable has resistance 33 ohms per mile 1/3rd Microfarad Capacity.

Diaphm of Phonogh with hollow Ball 1/4 Dia or a section

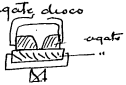


facing a rounded point and vibrated with a piezo, being charged statically see if get a continuous current

Alloys all kinds metals with Mn Cr V to get Magnetic alloys

Mn + Thorium make magnetic alloy

Get pair of 2" agate discs



Set up like a paint mill & grind wet under water, Various precipitates like Ca + Ba Sulphates to see if long grinding dont Enormously increase solubility

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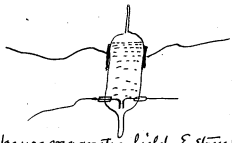
Na K Li Ca Ba Sr in tubes, dif wires, & open only by a capillary tube very fine to let gas out, Keep a long time under electrolysis to get nature of the deposit, look out for breaking down of the molecules.



also use magnetic field, E stress field Light from Hg + Carbon arc, X Ray Rad — 6 tubes put up Rack for continuous work — Long tube to hold 200 CC —

X Ray arc etc

Na K Li metals heated to get vapor

long continued action,

In Aluminium Rectifiers - All sol salts of Alumina - Formate Al Cyanates K Li NH4 Fluoborates Alkalis Fluorides of Alkalis

Probably Current passing thru a cell. twists the molecules like wire around iron. Try of strong Current in small cell shows any disposition to attract any metal or Compound Use single fibre silk allunder bell jar - put current on & off.

See if water can be made to conduct by use of any electrode element or alloy Sulfide etc also use with each trial E stress Mag arcd X ray etc

To test H_2SO_4 for series of hydrates
Test diaelectric Cap. between glass plate coef.
also viscosity, capillarity, absorbtion spec
absorbtn of light & heat, also time of
flotation of precipitates

Try fatique of Quartz, Rock Salt.
& fluoresc crystals to various rays
also reflecting & absorbing substances
to rays

Diaphragm, Exhausted Chamber
like barometer Mirror & lever on the
middle of Dia see if any sounds in the
atmosphere (2) disturbance of Barometric
pressure Vibratory in character during
Aurora, Thunder & Lightning storms

See in dark box in dark room of
any crystal is permanently phosphorescent

Combine with those crystals which fluoresce + give light when crushed. Sulphur Phos Se Arsenouite Etc Ammonia which change from Amorph to crystalline slowly = If the change is slow should get fluorescence for days –

Dr Grothe to make a lot of fluorescers with various amounts of impurities Contained therein for instance Cupro Cy K with say 1% of 100 dif impurities

Make some very large crystals of Clear non deliquescent crystals by slow evaporation in quiet place Crystals to be used for Exput

Determine Boiling point of water with amyl acetate on top –

Powder up all kinds of crystals. 200 mesh or 150 slightly moisten with its best solvent use steel dies + give greatest hydraulic pressure possible when hot, to get plates to experiment with, make some thin ones 1/8.

possibly there are substances of enormous diaelec capacity do for dia what a magnet does,

---

Possibly pure water would conduct if it was diluted enough by a diaelectric Hydrocarbon which dissolved more traces the water molecules might act as a gas would in a vacuum –

Try Hydrocarbons with water + mechanical agitation + points close together.

High vacuo heat pole by sun glass get Edison effect, + continuous conduction get highest vacuo beyond X ray stage use absorption methods also, absorb Hg vapor Important to prove electricity goes on the Ether when matter is reduced to lowest stage

Take several salts which are not deliquescent but are Transparent, melt them in their water of crystallization under great pressure and then slowly cool, see if can get a good clear block.
Do this also in sealed tube with water absorber — put also in fields —

Fluorides & Phosphoric acid have bad effect on LiOH better keep these out of cell —

All salts Lithium Sol. least sol Phos Li
Phos Na + Li fluoride Li + Si
Li salts even come not precip by perchloric acid
Sulphate Alumina Oxalic acid Bichl Pt
or Tartaric acid — Probably LiOH, in Battery stops formation Al_2O_3 films
+ is a solvent of something or prevents solubility " " which NaOH or KOH dont, The cell stands up on hot test quong twice cap of K + Na therefore must keep NiO_2 stable —
Li forms peroxide when LiOH is heated

Try plating Zinc on Magnesium plate from Sol containing strong Silicate Kott +

Telephone receiver —
Tellurium or Selenium point
Very fine + short or ball probably
better say 10/1000. dia

This will have enormous resistance and will heat, if Te Se has anything like expansion of Sulphur it should make a loud telephone + non inductive. Try Red phos, conducting variety of Sulphur Tungsten bronze Magnetite Sulphide Silver Vanadium Ox — Sulphides etc probably want special induction coil so Red Coil be about same as contact point — Try anhydrous Ni_2O_3 Co_2O_3 also as Thermo,

Telephone Buttons use silver cp press Tungstic acid in Ag + Reduce in H, also press reduced Tungsten powder very fine into the silver, press + repress until surface fully covered, Ditto Tungsten Bronze — Magnetite, Platinig-

Ni Fe small test cell. Try absorption spectra when cell short circuited - ditto with Lots metal oxides + Chlorides Bromides + other radicals of every kind with an alkaline base also compounds held in solution by Citric + Tartaric acid — Also try Lead battery, also Electrolytic decomposing cell with 2 sheets, also plating Solutions —

See if the bright lines of the spectrum are reversed by passing thru very thin films of metal deposited on glass in Vacuo, also those metals which oxidize seal them in vacuo

With a thermo pile joint paint one with lampblack to lower its temp by radiation + polish the other note dif in Voltage at 212 —

Uranate Lithia should be interesting substance (Anhydrous by fusion Tungstate Lithia also)

Thermo pile surrounded by helix –

See if current given if iron wire, or any wire of a metal touches a strong magnet (10) current given out at junction, also different metals laid on magnet, have metals very thin + then touch with another metal Use galvanometer see if current steady, magnet on + off.

Make saturated solution of a good crystalizing salt then stir in hot clay $SrCO_3$ + other precipitates + let whole cool off + crystalize — Seperate Crystals by Hydrocarbons.

Saturated solution hot + while hot pass powerful current thru while cooling + see if change Try also above in Mag field + E stress Try phos + fluorescers salts + if any salt fluoresces.

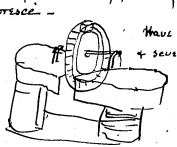
Very thin Vacuo deposit of metals + note absorption spectra, Conduction for Elec also same in Mag field, Heat stress on glass, current passing not action on light reflected

Volatilize Subliming chemicals through helix also magnet. note phenom.

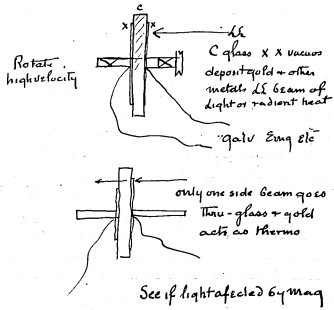
Cores of dif metals alloys etc 1/8 dia 1" long wound very fine wire, + sensitive Gal. Eng wireless receivers touch hot wire dif metals see if get kick =

Make small helix of say 1/4 bore 1/2 long 1/4 thick of wires of all the metals that can be got into wire + insulate wire –

Make a transparent disc or disc of insulator secure pockets on its perhiphery in which Crystals are placed with one side of pocket transparent Collodion for instance + whirl it thru a concentrated magnetic field at highest velocity possibly to see if fluoresce –



Perhaps an exceedingly conc magnetic field would alter fluorescence of crystals, the strength Color, spectrum, rate of dying out, susceptibility to heat electric stress X R or radium — possibly some crystals which do not now phos or fluoresce will do so under these conditions — also in a helix with strong amp + oscillating current,



Thallium Salts more delicate test for oxygen H_2O_2 than KI + Starch use for chem Recording —

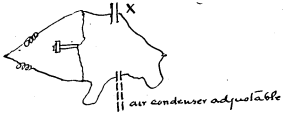
Try Oxalate Thallium for fluorescing

Thallium Salts sensitive to Light.

Eng – Aluminium cylinder with film formed in Na Carb then pen resting on very lightly. or the pen have film formed on it or $SrCO_3$ used moistened with Carb K –

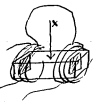
Put K polysulfide Liver of S in Carb K or other Al Ratcliff Dol to prevent loss energy – Ferri r Ferro etc those Salts which go up & down by Oxdtn

See if conduction of Electrolites by Kohrausch method is same when dif metals are used for Electrodes —

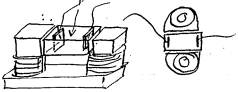


Capacity slide in X all kinds plates of powdered crystals hydraulically pressed ~~a~~ other matter for Spec Inducit Cap

Point resting on metal cylinder Emg wireless current fuses to it —

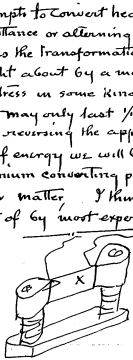


Box or cell, surrounded with helix of wire to magnetize & position the molecules — pass beam radiant heat thru liquid — use plating Sol say Sulphate Zinc Zinc Electrodes, also other plating Sol Fe etc, The molecules being positioned should give Current * "also try it thus



Move the beam — use radient heat from Zinc or metal of which Electrodes made of to Gz in molecular resonance,

In all attempts to convert heat into Elec use intermittance or alternating movements of the heat, as the transformation will probably be brought about by a momentary or limited stress in some kind of matter, & then cease, it may only last 1/1000 of a second hence by reversing the application of the source of energy we will be able to utilize the maximum converting power of that particular matter. I think this has been lost sight of by most experimenters.



X is plate of glass having a semi transparent film metal deposited by vacuum process - pass intermittently beam radiant heat. It should transform it to E as molecules are positioned by the Mag as para or Diamagnetic. Try several metals.

I think that iron gives a black film whereas Ni Ag Au etc gives green, this peculiarity of iron may have something to do with magnetism put in powerful Magnetic field & see if its transparency is changed by magnetism

With Oxalate Lithia & arc light use absorbers of light of different refrangibility to see if it is Ultra Red or Ultra Violet or beyond which causes the fluorescence use Quartz sides to Cell, possibly its Intense or high amplitude ultra red that does

See if Carbon Tetrachloride dissolves or affects Kineto films also experiment on use Telra to stop Combustion of film.

See if chlorinated acetate of amyl isn't a solvent for film stock, & also if some highly chlorinated hydrocbn solid & perfectly transparent isn't soluble in amyl acetate with Collodion to render non inflam —

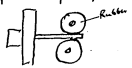
KOH dissolves film stick. soak in weak sol. + dry away from CO_2 this will concentrate + semi dissolve the film stick at the juncture of the filament + film + then when dry it will act as a cement after KOH removed

Have Howell flash a Tungsten + Tantalum Lamp with Carbon at as low a temp as possible then see if forms Carbide at high temp — to measure its economy + life -

Any theory of the Ether must explain

1st must be isotropic
2 must explain polarization
3 why light travels slower in glass than a vacuum (if it does)
4 Aberration
5 Double refraction
6 diffraction –

Rubber roller pressure foot for Eng



Perhaps $Ni(OH)_2$ will go to Ni_2O_3 if cell heated + $LiOH$ used 13% + saturated with $LiOH$.
this would be good for Thermo Conversion

Arrange very delicately suspended fluorescing substance for dif rays + note if attraction of anything

Polished plates of Gold, platina etc Lay on these plates, pieces of metal of higher voltage in the electrolytic series than Bismuth After long contact develope if any penetration of the metal into the Au Pt etc for development use Conc Formate Bismuth which will in time by electrolytic action deposit black metallic Bi

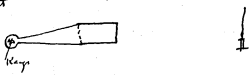
Also use a stencil of some figure and put between plates try at ord temp if it throws off metallic ions + give figure of stencil on developement also increase heat use Mag X ray XYZ E fields + also heat with the fields

Formate Bismuth in Gelatin on glass ought give Photo,

Also metallic powder higher than Bi in electrolytic series spread on glass thru transparent non-oxidizble medium should be oxidized by Ultra red, hence a photo could be developed by formate Bi the oxidzd particles not showing black as only the metal would reduce the Bi Aluminium sheet might work with Rock salt hence the oxidzd part of Al not being reducing possibly other developer than formate Bi would have to be used as its slightly acid, Cu in cakes Could photo in the dark —

Selenium absorbs Hg in Vacuo, try it in extremely fine state,

Experiment with jingling Keys in closed chamber with funnel & sensitive flame idea is that the higher the rate the less there is of lateral spreading out once wave is plain front



Theory

Canalization of electricity along a wire is due to the shortening the vibrating path of the Ether particle by interposition of molecules of the wire if wire was 100 miles long & 50 of it was space taken up by the Molecular orbits the space travelled by the ether particle would be ½ of what it would be in free space outside the wire hence the path of heat res would be the wire

Theory The reason light travels in straight lines not spreading out like sound is that the Ether has no pressure but consists of ~~st~~ fine particles suspended in space by mutual attractions like planets but ~~the~~ particles are in rapid to & fro oscillation not promiscuously in every direction but lined up in every direction. A Crystal of a chemical substance representing these lines, The wave motion of light at right angles to the direction moving only occurs when the oscillation strikes matter but this form of motion does not take place in the Ether — The reason why it takes

This form when the waves strike matter is due to the propagation of the waves thru matter by flattening somewhat the circular orbits of the molecules by the impact of the ether particles

Theory Light waves passing thru a prism the waves having the most rapid vibration will deviate to the path having the least resistance or least molecular resonance.

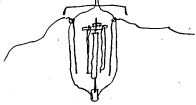
Theory Why cannot gas pressure in a closed space be explained by showing that the molecules have orbital motions like planetary systems, all molecules having same dia of orbit + when the pressure is doubled the orbits diminish and give out energy a molecule in space at absolute Zero having still orbital motion of its particles + all of the same dimension for all elements passing of a gas into a liquid being a mere act of pressure changes the orbital diameters + would be instantaneous if the Energy could be removed fast enough + no critical point

Thury

The difference between molecular matter + the ether is that the latter is elementary + single particle whereas matter is a compound is complicated + made up of many particles has orbital motion, imitative of planetary systems, and they have no motion of oscillation themselves only move by convection all motion in matter being due to the movements of the Ether altering the symetrical orbits of the atoms or molecules.

Make holder for Albert Wurth to hold 6 strips glass + rotating armature to deposit metals on in Vacuo.

Dally also make one with 4 in lamp bulb + .



Use arc furnace highest conc. mix metals + metalloids + analize resultant for new metals or changes —

Kinetoscope with motor and storage battery with clockwork control, Take Rose bush, peas etc use arc light take picture every 3 hours during period 3 months,

Diaphragm Silver deposited 1/2 inch dia in Center, facing is a Voluto coil 3 or 4 turns Connect to wireless to get oscillations about 100 000 sec use adjustable inductance — use funnel. Sensitive flame also see if there isn't very little lateral propogation of the wave also if it affects a gold leaf electroscop

Theory –

Molecular matter in a closed chamber under pressure the molecules are at rest and the pressure is attained by the bombardment of the Ether particles against the molecule on account of inertia of the orbital mass of the molecules they press against the glass & stay there pressing against the walls their circular orbit being distorted to oblong orbits by the constant bombardment of the ether particles –

All atoms have the same orbital diameter

Compounds formed of different atoms form another system. Either the radicals will form the central orbit & the bases will form an outer orbit both going together having a larger dia orbit than an atom or vice versa —

Expmt. Emg principle

3" bearing - determine Coeff of friction to weight -

Make very high speed gyroscope - small motor + little high capacity storage battery, balance on a scale + note of change of weight - if so try motor + gyro in Vacuo with leading in wires

Instead of a prism use cone shape rotate at high speed use slit + Spectroscope also try, reg prism + shutter + rotate,

Possibly attraction of matter by Tuning fork is electric motion of air (10) compression electrify it + produce attraction test it.

Deposit metals in Hg Cathode (rare) also when Hg has Lithium in it ditto Calcium

for studying crystalizing in strong fields use Micro + glass slide a drop of the liquid also several restatant drops -

Theory If molecules or rather atoms are in a state of rest only their electrons moving in orbits + it is only the ether particles which Convey motion by disturbing the orbit. The the movement of the ether particles in a helix would Cause the orbits of the iron atoms to be turned from circular to oblong + diminish the diameter of the Bar + lengthen it. The effect of Electric as against Circular in connection with shortening the path of the ether bombardment be the cause of magnetism If iron hardened the orbit would not return to Circular -

from Experiments on a non com dynamo made recently I am inclined to believe that Magnetism is purely Electric + on the surface of iron Entirely

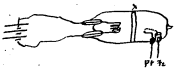
Theory

With very thin films of Nickel from Vacuo deposit light or heat waves striking the atom should flaten its orbit + this should produce magnetism by using a helix + a shutter should get oscillatory Currents Try other metals as well, + if unlike iron they have not ability to direction themselves use powerful Mag field + then light

Investigate the current produced when the Chalk cylinder is rotated = make quantative measurements Volts and amp — use dif Chalks + liquids —

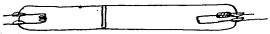
Wave lengths of light vary between $\frac{1}{33000}$ of an inch for red and $\frac{1}{55000}$ of inch for violet mean value $\frac{1}{45000}$ inch

Think Mellonis expmt passage radiant heat thru matter should be tried in Vacuo.



X the plate of material

first try in air keeping current constant, then in vacuo



Long tube 62 better say 3 ft to keep away convection currents of air. There are serious difficulties in this experiment & I guess can only determine relative conduction of dif materials in Vacuo only.

Try Flintglass Rocksalt Icelandspar Quartz Borate Soda Mica Citric acid Rock alum Sulphate Copper & others – Kunzite,

Rock alum absorbs heat rays, perhaps to fluoresce invisibly + if made a lense might raise rate vibration up so it would cause ptBaCy to fluoresce.

See if refraction of a transparent iron salt is changed by a magnetic field or X Rad & stress light right angles. boiling the liquid Try other liquids than iron salts.

Aluminum Rectifier See if affected by magnetic field- & stress Rad, Light shining thru liquid on the film-

Mix fine powder fluorescer with good transparent absorbers of heat & compress hydraulically in thin plates, powder very fine also dup with both powders slightly moist See if vibrations of Ultra red absorbed with set up strains in the fluorescers and give light also when possible put the salt in powder which is least soluable into the conc sol of the other & crystalize over it.

Try Tungstate of thia ignited, for X fluorescer also Uranate Calcium with & without ignition

Subject liquids to spectroscope + powerful fields to alter absorption lines etc Nitrate Ni especially at it cuts off sharply the red + violet ends if possibly can be magnetized

Daily make lamps thus using Tungsten municipal filament, X is slip glass with several patches of crystals all dif to determine fluorescence + phos by Ultra Violet direct without interposition of glass or other absorbing medium - bring filament up as high as possible for a moment only

Kinetoscope Use Quartz prism, Ultra violet light from arc light, then throw picture on screen coated with a fluorescer. Oxalate di etc

Wheel mount slides on shutter no light coming in dark room, to discover good + rapid fluorescers for Kinetoscope.

Test slides containing crystals with Tungsten Municipal, high + momentary –

Think porous partition could be found with pores so small that only the Lithium molecule could get thru not K or Na By using heat + proper fineness the dimension of many molecules possibly hydrated, could be determined by conductivity of Sol.

See if there is any phenomenon when fluorescers are dissolved If solutions are only enormously subdivided crystals + the ultimate molecule a crystal Those crystals which fluoresce should when dissolved absorb the particular ray they fluoresce to + liquid in dark room might if eyes very sensitive give a dim light – if not could leave Dry plate photo against cell for few days with Cover + hole into photo The hole Benzol chemicals probably good,

got rid of it by using alternator – May 20 1907

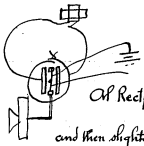
Emq Coat ends of cylinder with Ni_2O_3 or nq % mix – or press disks of same or use washers of lead zinc or other metals Each end of $SrCO_3$ to get rid polarization

Also discard connection of cylinder to mandril & put on auxilliary pen so both Electrodes will be moving

Investigate the current & voltage which arises from turning the Emq cylinder also which kind of cylinder & solution gives highest results —

John Ott make 3 test cells long tubes with smallest amount liquid possible —

Notice spectra of the scintillations also spectra from light of scintillations from emery wheel with metals and also Quartz, Beryl, Pitchblende and hard compounds of dif metals may be a rough quantitative analysis on the field with Direct vision spectro



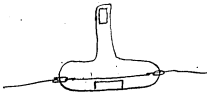
Of Redfr. Balance X

and then slightest movement should give powerful current as high voltages and strong currents can be used

Try Aluminum Rect on Spark coil connected to Vacuum see if it dont change phenomenon of the discharges. How it affects X ray Tube

Wet Emq Thallous Hydroxide – Ammonia –

Filament in Vacuo laid flat near solid steel block, above it another block held by magnet bring filament up as high as possible & let block fall – to flatten Carbon, Jungsten etc –



Peltier effect on thermo may be electric cementation
Try hot exp'nts by passing current from one
metal into the other, joints scraped to fits if
possible in vacuo - using Tungsten spiral adjacent
use strong currents + shield all but junctions
from radiation - let it go for several days
Then disconnect + scrape small amounts off
surface + test in Spectro, making several
scrapings to test depth cementation has
penetrated Try Red hot carbon pressed
against soft iron - see if iron hardens.
also Tellurium against Bismuth, Electric
production of alloys so to speak Find
several alloys which give heat on formation or
are definite + try the two metals at junctions
also the alloy opposed to one of its metals
+ current sufficient to decompose it, there
should be absorption of energy + production
of Elec + be a good Thermo

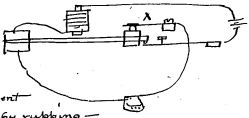
It is possible that thermo piles or couple
should not be placed in contact but another
metal intervene + that a good couple should
be tried with every kind of conducting material
intervening between them with hopes of getting
better conditions for H into E.

Heating the whole pile while Elec is passing junctions may affect the voltage —

See if thermo junction heated under pressure affects Voltage

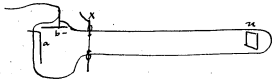
filled distilled water + heated to get pressure

Try experiments on Thermo of heating the whole Thermo several hundred deg + then heating the juncture 100 deg hotter. get curve.
Try in Vacuo - use ~~Tungsten coil~~ Platina coil.
immerse whole in oil for general temp.



To test
Thermo current
produced by rubbing —

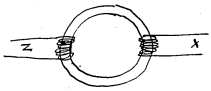
Vacuos deposit — make thus



Vac tube exhausted to best point tube 36" long glass plate n at end a b the electrodes of gold X a platina wire 1000 dia — see if molecules go in straight line + cast a shadow + deposit no gold on shadow. if gold works Try Ni Fe also deflect the paths + destroy shadow by magnet also bolting cloth place platina

Try in Vacuo Aluminium poles and put various things of low MP on surface of electrodes to see if can form deposit, on glass Try Sulphur Selenium, anhydrous trans + opaque + colored crystals see if S deposit is crystaline — Paraffine Phos acid + many other things

See if Copper made cathode in KS or NHₓSulfis. is prevented from being attacked,



Let a 500 lb weight drop on part of the soft iron ring from heights of 10 or 15 ft put strong current in X see if mere deformation of the iron will give a current in Z.

Capillary tube of quartz – ends plugged with Tungsten Municipal filament to act as electrodes, Put whole in Vacuo of some Welsbach very porous material fills tube should get at proper pressure, light with very little heat, possibly on gas necessary

Make Rez Spark tube with Tungsten instead Rez Al Electrodes – notice any phenomenon – Also Sheet Tungsten for X ray impact Howell make.

Vacuo deposit metals on glass also coat glass with Canada Balsam & deposit on this - also Castor oil — lay flat when flowing liquids used, could determine velocity of a metallic Molecule from the the distance from the surface of the castor oil the film is formed, possibly it might not penetrate & yet it might deposit on the glass nolwithstanding there was a film of 1/32 of Castor oil over it=

See if Magnesium electrode will act as a good Cathode in all plating solutions which are slightly alkaline & see how alkaline they can be made, Try plating very thin films metals so as to be transp —

See if Magnesium can be plated by Vacuo flash process.

Eng — over Silver cylinder stretch over thin rubber elastic - moist = KOH, Etc

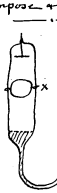
Metallic disk Emq rotating in liquids—

EMq - Moisten chalk with Diaelectrics,
Tetrachl Carbon, Benzol, Myrbane Cumol.
Turpentine, CS_2 & other liquids — also
try spark coil + Req silver button Carbon
Transmitter —
also metal cylinder coated with hard
diaelectrics varnished on like shellac, Silicate Soda
Sulphur - film dope, gum varnish etc.

Try absorption phenomenon in spectroscope
all metals in films obtained by vacuo deposit
thick and thin, especially lines from a
metal same as film Try when heated,
when in strong field right + left also when
current passes DC + AC + high rate
oscillations, also when heat Mag + E
acting conjointly + all combinations —
different source of light + also from
spark.

for depositing high MP metals like Pt + Tungsten, ignite the oxides form loose strip + Reduce to metal by H_2 then the fine particles will reach MP easier.

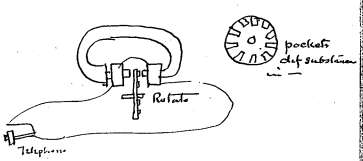
Vacuous deposit find three metals that give the 3 primary colors by transmitted light, superimpose + see if get white or focus sep.



X ray o stage vac
x platina damper, piece iron on it to control outside by magnet, Bombardment of mercury Causes index to rise, H can be 33" high -

Daily deposit carbon from Recovered grafite also from a flashed filament,

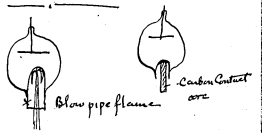
Coat platinum wire with various substances which will cling & melt or 1st coat with Acetate Mg. & ignite then coat this with the substance, & flash vapor in Vacuo & deposit on glass. Try Sulphur Arsenic Selenium Fluorspar Cryolite Na Cl, KCl, Phos Na AgCl, Boracic Acid, Borax PbCl Silicate Zinc Willimite, Tungstate Ca anhy Pectolite, Sulphides for very infusible non oxide compounds Use Tungsten filament



X ray tube buried in solid cube Paraffine 1 ft sqr - see if sound ~~shadow~~ shadow, when Rg light + X comes thru slit - use photo plate, if any deviation two lines will not coincide

If iron decomposes Cyanogen in redhot Kcy then an iron filament should decompose, Cyanogen in Vacuo lamp + receive a maximum deposit ~~#~~ perhaps some phenom show up use side tube heat AgCy —

Possibly make diamond by fusing KCy alone with iron under pressure in sealed tube or with some Sulphur - dissolve out + exam residue micro, Try Xanthate K + KCy with Fe sheet also powder reduced by H, also use arc,

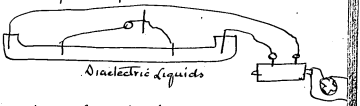


X platina

OVER

See if Telephone or Eng interpolated in circuit when Vacuum is so high no current passes from powerful coil when cold & then heat. If it works extend distances of tube several feet if no change Resistance make a spiral tube – I am almost certain if the 2 waves of the coil current are equal we shall have conduction – even think 1000 V Continuous will give current of not 1 V. This is Edison Effect

Wireless induction coil with Balls & cap for 1 Million sec ought to give sound waves in the air. Use lead disc 24" dia see at edge there is a sound shadow. Try a wireless Receiver of no response then?



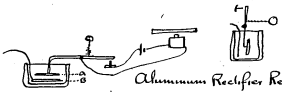
Induction Coil see how far waves of tones are transmitted

High speed waves 100 000 or more
" Phono - Records
Slow down so they are audible

Connect a tube to phono + let discharges from Induction Coil produce sound theirin
Run phono 500 Rev — Then slow down

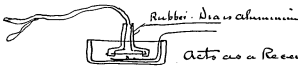
Make condenser with lead foil + Aluminum + paper soaked in a hygroscopic Carbonate or phos etc

A closed ring trough filled with an electrolite say Bi Carb Soda - divided as far a can by a floating partition of a sheet of Nickel with sheet aluminum on other side — When induction Current is sent into water this partition should float in one direction -
Also a pendulum should be moved in the liquid - The CO_2 Radical should repel the Aluminum -



Aluminum Rectifier Relay

on the assumption the CO_2 Radical will give repulsion when evolved at the Aluminum electrode,

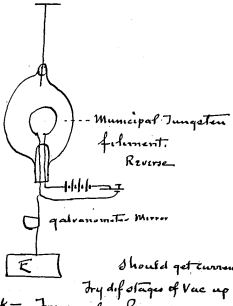


Acts as a Receiver.

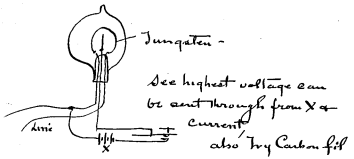
Dinitrobromobenzol – remarkably large crystals by crystalizing once from Naphta + 5 times from Alcohol the concentrated alcoholic sol Emits sounds when the salt crystalizes — see if light given in dark – also try modify sounds by Magnet, X rad – Elec diaelec stress – this may be good substance to try experiments with on control of Crystalizing

Naphthalin sublimed twice – digested with strong hot H_2SO_4 washed with KOH. & distilled therefrom by steam crystalized twice from Naptha & 3 times from Alcohol. is when powdered highly electric,

Air has a voltage which varies as we recede from the earth,



Try dif voltages of Vac up to no spark – Try wireless Receivers –



A spark does not pass thru high vacuo due to enormous attraction of one of the electrodes and also of solid matter for the gas molecules. when a wave come from the P matter things all the tighter, + no stress can pass, no contact with the ether is possible Compound matter is attracted by effect of the elec like dielectrics are in a leyden - like the break in an electric furnace by matter piling up around the Electrodes Think of Tungsten fil used a high Temp in Vac as one pole that conduction will take place in any stage of Vac.

If X ray tube the ray itself is due to those particles which go in a straight line undeflectable by a magnet then it occurs in ordinary incandescent lamps + when depositing metals in low stage of vacuo - as these give sharp shadows as well in poor as good vac - possibly the energy of the blow is wasted by cushioning against gas layer on the gas and the oscillating periods so diminished that they do not give fluorescence or photography - possibly photo plate in 48 hours might.

The reason X ray cant refracted etc is that it is due to the vapor of matter raised to gaseous state + has no rhythmic sequence.

Photogh thru the various flashed films all the dif metals

Act on Uranium - Mongste Barium Lead with Arc furnace see of increased Radioactivity

June 1 1907

Have just struck a good principle —

Take a permanent magnet like used in large Telephones with double prong permanent mag insert a small Pacinotti armature 24 slots Commutator dia 1/2 inch length 1/2 inch Rev 6000 min — around prong to vary the perm field in the 2 telephone line spools If now signals are received of over the line by talking into a Bell Receiver this varies the strength of the field, now the armature revolving at such a high speed the impressed voltage is amplified enormously & Retransmitted with greatly increased Current. The extra power coming from the motor rotating the armature,

This permits of doing away with Carbon Trans & Battery on telephones using only the Recr for Trans & Recv — A phonogh style of clockwork runs the motor, The winding of same runs Central Bell, a part of the winding Time only be used —

This makes possible a Real Microphone an amplification of Phonogh sound — use in Telegraphy & many other things

pr

Plate out Aluminum from Al salt or KOH, on Magnesium Cathode – in presence of a powerful reducing agent like pyrogallic all out contact air say under layer Paraffine oil —

See if Al_2O_3 plates out on Magnesium Cathode in Aluminate Soda or K or with presence of free alkali — also on other metals, to get sheets of it —

Think some results obtainable from superimposed films of metals each very thin so light will pass freely through all – use in sunlight spectro Ele

Measure electrical resistance of films of metals deposited by Vacuo process also when under influence Mag Light, Heat X Rad Ete –

Use glass coated with Sulphur + deposit Hg upon it. by heating Hg inside Tube in Vacuum film forming Tube also use Electrodes of all the metals to form films on the Sulphur surface –

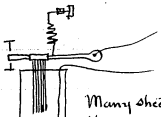
Test Emg for self producing current when rotated using dif cylinders, liquids, + heat.

Experiment with Edison effect wash out bulb with Hydrogen & other gases.

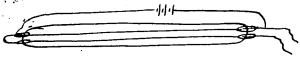
Try Carbon filament + central wire at best point in Hydrogen Vac for flashing + then at dif points as vac gets better, for Edison Effect.

See if Ultra, Light, Rad X magnetism Effects surface of Aluminum rectifier

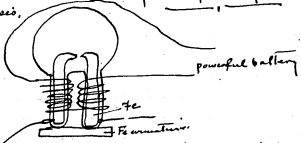
Iron & Copper wire red white hot one end in dark room with photo plate also with & without best fluorescence on end of wire Suddenly quench heat and see nothing – Repeat many times + develope photo – Try Gold leaf Electroscope



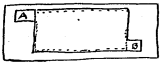
Many sheets of metal seperated by 1/1000 inch Mica at places, immersed in a plating Solution so no gas given off use same metal for anode + Cathode, say Copper Use alternating Currents Capillarity to be used + varied to produce motion.



Measure resistance, manganin wire when Current passed one wise, way the ditto the other — The Vac being so high no spark passes.

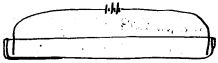


Raise Vac till Coil passes no spark no Energize Mag + see if it passes.



glass plate.

first flashed in Vac with a transparent film of metal, with a guard over it to produce right shap giving the lug A for contact Then put guard over & flash the second metal B. When these 2 lugs are connected to galv we have a Thermo pile where there is no shortcktg of the Current the lugs being single metals or layers Can determine thermo pile actuatg at Light heat Etc Could use Platina & flash Pb Etc — use light with alum Cells Etc - Could make quantitative measurent with this — Also Selenium-Tellurium —



Plating Sols & others

Long Trough - saturated Solutions. slow cooling - see if more crystals at one or other poles if crystals are dif or are positioned

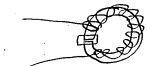
Make cell thin glass - rubber tube between immerse photo plates in all kinds solutions, organic & inorganic & — photo always a fixed object with constant light & conditions to bring out phenomenon — Have a circle of colors also in the photo also magnetic field,

In Rectifier try K Iodate alone & in KOH with Ni + Pt plates —

See if cementation between red hot carbon & pure iron can be hastened by strong currents - possibly one pole might absorb C faster than the other this would be a highly concl thing if C could be forced into spots quickly by making the iron one pole then layer carbon then iron other pole the whole out contact air + heated,

Possibly if Magnesium cathode + very strong alternating Currents possibly Zn Mn etc in the Kott, would get light from Cathode if observed in dark room —

For rapid vibrations in Telephone make Cos extensions from perm magnet out of Iron reduced by Hydrogen using Ox from Ferrous Sodium Sulphate & Compressed —



Magnetic ckt splits measure inductive Cap when dif materials, liquids, solids close the gap —

See if there is anything analogous to Al Recip by Sharpened ends of Slitted magnet ring — perhaps above Experiment will show this

Scrape Aluminum + Lead discs 1" dia so they lay flat on each other, build up pile of 24 pair - press together strongly by screw clamp & measure Res & see if the res to current is dif according to its direction.

Cyanine a dye sometimes used sensitize photo plates to make Orthochromatic easily decomp by light, sometimes even in the dark both Dol & plates liable decomp. use for X YZ · X Ray & other things

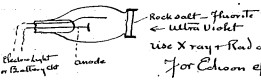
Perhaps there is a differential of Elec in passing from on metal into another according to the direction Thus Zn Cu Zn Cu like flake Try flake sheet discs 1/4" Sqr piled on each other press together, then alternate the current see if more current passes in one direction than the other - also magnetize.

Auto Telegraph paper should be fine way of trying chemical reactions electrolytically + removing the primary reactions away before secondary reactions take place can run paper 1500 ft min —

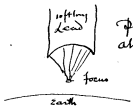
Try Radium tube between 2 plates Aluminum equal thickness - see if LeSage corpuscles? give stronger photo next to earth

plates to be exactly equidistant from the Radium metal tube —

Try shielding Radium tube from LeSage X by Lead rod 2" dia 10 ft long plumbed to point to center of the earth, see if photo more or less with + without rod.
Try other metals



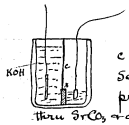
use X ray + Rad also —
for Echoon effect,



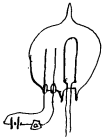
Le Sage
Photo plate at focus
also fluorescent
Crystalize things in focus

Also place lead over delicate weighing balance

See if capacity as a condenser increases
try fluorite also fluorite Quartz
Coated transparent film platina or silver
+ pass Ultra Violet X + Rad connecting
armatures to Electrometer or use
alternating C & Telephone



C is rubber X pressed Strontium Carb
See if 21% KOH Solution at higher pressure will force current of KOH thru $SrCO_3$ & give current of itself If not try Current get rate of flow. or C that will balance the column



See if Edison effect ultra from filament will permit C To pass

Scintillations from discharg from battery of Quad Condensers on closing are a series of Explosions of the molecules of the metal

Spectroscope at a b c d showed show dif spectra

Try scintillations in moderate vacuum of highest conductivity + so on higher manipulate spark point by a magnet from the outside

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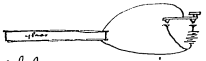
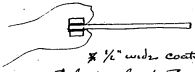
Absorption Spectra see limits of dilution



glass coated film metal each side see what effect light has passing thru.

Distortion Condenser.

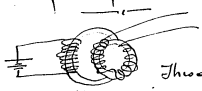


glass rod 2" long
* ½" wide coated both sides film metal, see if vibrating causes electrofiela covers, also connected to 100 V battery
see if variation of elg on vibrating

Take piece Kinetoclear film, coat with platinum in Vacuo – then immerse in KOH + dissolve the Nitro cellulose leaving clear film – Try platinum on polished sheet Zinc also aluminium coat off by KOH + Cl also polished Copper + coat off by KCy or Copper NH_4 sol this will show if films are perfect

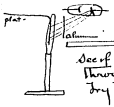
Get lot small prisms + coat with films of dif metals by Vac process.

See if intermitted light from arc by shutter gives greater or less fluorescence or phos. than over the same time when light is steady – also if fluo + phos substance having no any attraction

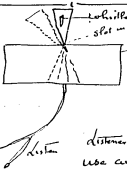


This should give a good transformer or nothing

Form plates for Optical work by successive dipping in Saturated Solution & possibly wiping Surplus liquid off solid at very thin layers



See if the Aluminium particles are thrown off see lines in spectra by thin shaffinin —



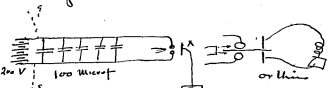
Listener in separate room — use air CO_2 Vapour H_2

Try low & high notes, Vary angle of funnel —

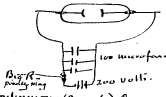
Heat Willinite, Balmain Fluorite $CaWO_3$ Red hot, then chill in water while subject to X ray also chill in Organic liquid —

See if Scintillations give etheric —
also if Ultra Violet light will cause
discharge when points further away
& thus give stronger Scintillations

Fire a bullet through water the box having
thin cover of substances giving clear
hole also bottom, See if alignment
is perfect — Think there will be refraction
or bending like light — fasten postal
rigid & fire by magnet. If refrac light
follows mechanical laws & caused
bell be worked out by this method
of Experiments use high & low speed
bullets & dif liquids, Even solids
ice for instance — Crystaloids &
amorphous substances.



Blow air to X between points to platinum disk
see if get continuous Current



gradually make Vac
+ see if at any stage
Condenser discharge
points 1/32 apart
think should get

Continuous (nearly) Current,

If this device can be got to work it would be practicable to make a fluorescent lamp by Coating one terminal with fluorescent Crystals —

Try condensers with Edison effect in Various ways —

Have Dally Coat Zeeland spar with plat one side another piece both sides transparent —

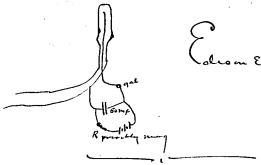
Possibly reason aluminum spots dont blacken Vacuum tubes is either that the Al_2O_3 prevents it like MgO on plat or there is a deposit of Al transparent. Rig up a magnetic scraper to clean the Al after Vac made - manipulating from the outside

, Use 2 helix + bridge with Telephone + test all the thermo alloys I have for magnetism —

Cell made of 2 glass plates, film platinum inside transparent — the platinum inside cell + to act as electrodes. Try Electrolytic Expts with Light, heat, (Radiant) passing thru also diaelectric Cap with + without Light,

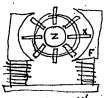
Investigate Nty from Ni Fe Storage cell. Use cell + pass N free of O + various stunts to obtain Nty from the air —

Eliminate H electrolytically from various solutions + finely divided metal Cathodes in presence of stream of air — also N — + provide for Nty absorption — also try heat, high as possible = We made Nty once by pass H over Fe_2O_3 —



Edison Effect.

Find old very much blackened incandescent lamp measure Res of the film.



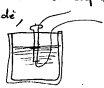
Non commutator dynamo X iron bars fastened to ring all of which rotate. Z is the fixed armature. F the field magnet. The doubt is that the magnet lines of force are fixed & do not move with the Iron like a current in a wire —

For coating filments with dif materials, put the stuff on the filment by dipping in Cona Solutions till right thickness is attained, Then instead of getting a Vacum + heating the spiral, use or heat fil in Hydrogen with phos anhy to take up H_2O if that is formed or if S something else. use atmospheric pressure or greater. Oxide of Lithia which is not reduced by Carbon could be got on Colourless & then after Vacuum would not fly off. Over this could put Tungsten
Tungstate Lithia —

Try double Beams'-

To prove that thermo elec is a species of ionic Electrolysis by cementation, make a lot of junctions all kinds put in series + enclose + put on a lamp current + run for several months. scraped fits at junctions under elastic + strong pressure, afterwards scrape off + test spectro.

See if there are currents at junctions metals + liquids where it eats away like the Zinc hanger in Leclanché,



Pure Boracic acid in H_2O without any trace of Alkali is one of the worst conductors known

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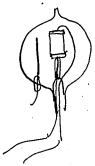


For flashing films use lamp bulbs

Seal off + then can keep from Oxdg + measure. Res. etc

Peltier effect – see if thermo couple don't expand more one way than the other when current sent through —

———.———

Pane glass – tin foil each side, see if bending don't change it as a Condenser —

Some phenom should come from two metals immersed in Hg one of which amalgamates + the other like Nickel that don't, should have dif Res according to direction of the Current, Thermo on heating etc,

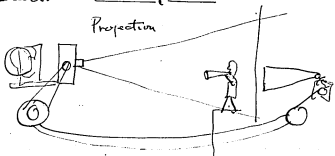
———.———

Rubber funnel for phono (soft) diminishes amplitude high notes + effects low notes very little, thus correcting phono,
This is probably reason rubber listening tubes appear make music perfect,

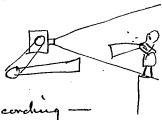
For high voltage dynamo, have the armature fixed and rotate a commutated field.

60 000 Volt would then be easy to commutate as current etc is small — The armature could be in oil —

Projection



Kinetophonograph — get unison by synchronous motors —

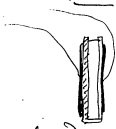


Recording —

Use magnets to record on film + Record the "starting point".

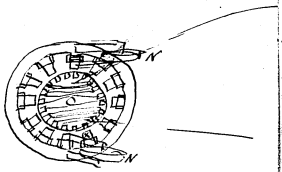
Try smoke ring box with Ether + 10 ft away a flame - project the Ether vortex into the flame
Try tetrachloride Carbon to dimmish flame
Try a moist paper of phenolphthalein + project Ammonia rings.

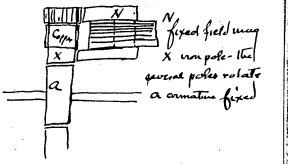
Test slides with the Crystals between pointed poles big magnet with light, & X ray Rad,



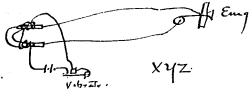
Narrow glass cell or thin very thin - Tinfoil on sides. Carry out various chem reactions in cell see if it becomes charged - also Tin one side & Pb foil other all on outside.

Try making solubility Experiments cold & also hot of various salts in Electrostatic field Magnetic field, Ultra Light, under Rad & X ray - Mag & Electrostatic Combined - also under Electric stress in narrow cells -





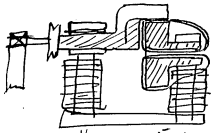
The fixed field magnet, when X ring of poles are rotated make a field by induction in the closed Copper coils - Hence we have an induction field which is provided with a "Magnetic Commutator" something new & this device makes possible a high voltage Continuous Current Dynamo without Commutator or brushes —



Filiment that should be not Tungsten

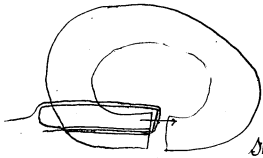
Flake Graphite same as used in battery purified by molten KOH, HCl ground up in chilian Mill with glucose or Rosin resolvant to Tear flakes apart & to impalpable powder same as given Albert Smith to try on Phono Records in machine built By Johnson — The grafite was floated in Gasolene & only that which was suspended was kept for a little while used —
I propose to squirt this kind of grafite in the old filiment die to .002 inch using a soluble chloride in Water say as a binder) by bring up in Vacuo the chloride would be vatalhized then the filiment could be brot up to dazzling heat to cause it to toughen Think it will be nearly if not as economic as Tungsten, higher specific Res & will be much tougher for shipment —

Latest Oct 10 1907 Continuous current high Voltage dynamo



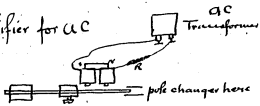
Made this-don't work – magnetism apparently is a surface action, can't penetrate Conduct lines force

They are entirely excluded by this shorted work –



Showing principle

Rectifier for ac



Reed or Tuning fork worked by ac. from transformer & reed tuned to cycles; This gives an inch amplitude at the end, here are arranged a spring Contacts to straighten the Current for chg the battery The springs of contacts may themselves be tuned so 20 @ 40 amp can be handled made a trial today of 1st one not yet got it tuned — Made this, goes good am trying make it for heavy currents & Commercial —

Feby 6 1920 [175]

About the matter in space, Ether
protons & electrons

Theory 1

Excessively small particles not subject to further division travelling thru space in every direction, at speed of 186 000 miles per second.

2nd These particles strike upon this Matter probably slowing up but pass thru the Earth & emerge with lessened velocity, but in time owing to the very small amount of matter compared to the space they regain the velocity by impact from others going full velocity

3rd While now the natural velocity of this particles is 186 000 miles per second, its probable that these encounters with matter which causes loss of Vel & of course Energy will cause the Vel of this kind of matter to diminish as a whole say at the rate of 1 ft per second per Billion years

4th Gravitation is due to the bombardment passage of these particles (Le Sage Theory)

5 The reason that the sun attracts the Earth is due to screening — the earth is in shadow of the sun from space in line with the sun + beyond it,

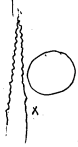
6 The Ether particles pass thru the Earth in every direction + thus would be zero pressure if there was no sun: planets etc, Meanwhile particles passing thru the sun + striking the Earth will have very much diminished velocity compared to the particles striking the Earth on dark side ~~to~~

7th = Hence the velocity of the particles between the bright side of Earth + sun will be less than on any other part. This will pull the Sun + Earth together

8th All others planets + bodies will screen each other in proportion

to their size + mass.

9th particles passing across the sun should be attracted because the particles being received by the sun is full 185 M sec while particles passing thru the sun have diminished velocity hence the collisions will not cancel out ~~the~~ hits on both sides must be the same ~~as~~ particles will go in a straight line ~~~~~~ or rather wavy line – otherwise



it will go like X

1. The velocity of light of other particles must be different + higher in shadow than in sunlight of particles from the sun.

11th The rotation of the Earth around the sun is due to What. Original Motion perhaps as it gets these particles at same Velocity in front & back those Entering from space at Velocity of 185 m/sec Exit at Shade less, same way Enter back side 185 m sec minus Earths Velocity & Exit at front — Shade less, hence It must be due to original motion & the revolutions around the sun must be taking longer time as the years go on — Its slowing up the Vel of the Earth around the sun being the function

12th — If Solid matter was receiving these particles at Vel of 185 m sec & was the same in all directions it would be stable as pressures due to slowing up of particles would be the same on all sides but If by screening this matter by a large mass of other matter so Velocity at one point on the small piece of matter was considerably

less there would be a disruption
~~of~~ of a small part of the little mass
at the exact place where it was
changed & at its critical or disrupting
point & particles might be
thrown out into space at high
velocity & varying velocities
until the whole of this matter
was disrupted by this means
we could utilize the energy
of the Ether particles to the
extent of the Earths retardation
of the velocity. Possibly
Uranium is that form of matter
& the energy is not intratomic
but is due to unequal Ether
pressures.

13th If the Ether particles can
be allowed up they can be
accelerated above their mean
velocity of 185 M per second

14 As the particle receives innumerable
impacts in every direction the

particle must have side motions in every conservable direction but these for long journeys are cancelled out & it travels in a straight line except where it passes close to large masses of matter like the sun there it meets unbalanced conditions for considerable periods this alters its general direction but the small wavy motions are always with it

If the Ether particle is a volume then the front or direction of motion of position will be opposite side to Negative

B= Now account for Light—

A continuous spectrum from solid unchangeable matter has every rate of vibration 400 m m to 2000 million million per second.

Light from the decomposition of matter or changes therein is due to molecular explosions of the combination of molecules.

16. Sodium is not a single entity, it is double perhaps even more complicated on heating to sufficient temp it Explodes + these two explosions one is ~~other~~ quicker than the other +. These explosive particles hit the ether particles passing & impress on them a collision throwing them sidewise + the length of the train of waves on the Ether particles depends upon this time of Explosion. This sets up a train of waves in the ~~[illegible]~~ forward motion of the Ether particle. The next explosion after the first + most unstable form is decomposed is very much more rapid as more energy is required the train of waves are ~~[illegible]~~ closer together. Thus we have 2 lines in the Spectrum of Sodium

17. In the case of iron we have a very complicated system. When this is disrupted or Exploded we get 200 or more successive Explosions, those requiring the least Energy explode first the remaining

Molecule or compound being more stable then more explodes & so on until the entire molecule is disrupted. This will account for the many lines of iron in the spectrum

18 = It is not necessary that the exploding piece of matter should make more than one motion it need not make Millions. The traverse of the particle of matter is fast it will disturb Millions of Millions of Ether particles before it stops & these particles being hit one after another gives the light waves

If X is a bundle of Ether particles say for illustration Millions or 1/millionth of an inch - a slow moving particle N moving across them would hit one after the other & displace each Ether particle in direction of advance of N hence these particles crowding

at G would produce say 400 to 2000 Million waves impressed on the Ether particles one after another

The Ether particles although moving at 185 000 miles a second. are incapable of affording us any energy because they go in all directions & balance out! But the smallest chemical molecular explosion can throw a train of disturbances in the various Ether particles coming from the Explosive zone & while the total Energy in the train may be less than 1/1000 of a ft lb. it will reach Millions of miles unimpaired & then if this train of waves strike matter it will set the molecules of the matter in vibration & produce any light passing through the Matter for instance glass. This train of waves come in Contact at the boundary the Ether particles goes thru straight there is no refraction but the waves impressed thereon

are affected in various ways + may take a different direction,

19. There must be a limit to high temperature and that limit must be when Matter is resolved into its final stage (18) where no further decomposition is possible

Any form of Energy from matter can be impressed on the Aether particles A train of waves from radio can be so impressed & travel at 185 M pr Sec

April 8 1920

As I said before the greater proportion of the aether particles are passing in all directions at 186 000 miles per second ~~[illegible]~~ But particles passing thru large masses like the Earth are blocked down say to 180 000 miles or less The major portion of these particles

as they emerge pass into space + by collisions have their speed reduced by a slight degrading of the speed of all the ether in space which would be almost infinitesimal, but not all of the particles as so brought up to speed,

It is probable that in free space the particles are oriented by collisions into a space lattice of considerable symetry

Those particles which have the very slowest speed may by ~~[illegible]~~ collisions take a path not straight and make in vast periods of time an orbit or immense circle. This form constantly tends to diminish the radii of the orbit finally reaches a very small circle so small that it circle is less than a billionth of a millimeter then it becomes solid matter but

The speed of the Aether particles or particles. still whirl around the ring with velocities thousands of Mile per second -

Supposing there was an orbit with a single particle or many with a path 100 Rods; This particle would on the law of General averages be hit millions of times per second + the path of revolution would be wavey. This whirl we might Call Hydrogen If the radi of circle were less we could have Oxygen, + as the Aether particles got more numerous or the circle smaller we might have lead + when it got to the smallest circle in which the Aether particles revolved the would pack the circle so close that an Aether particle would be forced out + we call it Uranium,

Perhaps. there are many orbits filled with these particles orbits of all diameters, all so small that they are set aron

by the microscope – perhaps
several orbits of closely varying
diameters pour each other then
we have Many Kinds of matter

If there were in a certain space
many orbits exactly alike there
would be no trouble to imagine
that they came together as the
speed & diameter is the same
but those orbits which were
not the same the particles
which had not slowed down
enough to make a smaller
orbit could not join them
Which would have a solid Sodium
formed of Millions of orbits
all of practically the same
diameter. with say 2 Aether
particles, Palladium with
3 or 4 + Cerium with
500.

We have Two variables
1st large diameter wheels or
orbits down to the smallest
with only one aether particle

Duplicate varying diameter
orbits with 2 particles
& so on to the maximum number
of particles permissible in each
orbit, when that point is
reached then beyond there
would be disintegration of
the orbit.

In other words solid visible
matter is composed of ether
particles revolving in closed
orbits of varying diameter
& varying particles in the orbits
& diminishing speeds as
the diameter of the orbits
diminish —
All this being brought
about by ether particles
moving in space at 186 000
Miles second, slowing up
by passing thru bodies
Meteors like the sun & by
Collision with other particles
of Ether, throwing the particle
into a circular path which

once done will travel in that current for take Millions of years to make a revolution + at Every revolution within this path meet condition tending to make the orbit smaller + in Countless Aeons of time contract to an orbit so small that it becomes fixed in space as an atom but beyond the limit of our Microscopes in other words what when a great number coalesce together form what to our Eye is solid Matter.

When I mean orbits I mean 1 or more particles moving around a circle in the same plane not a vortex ring a la Kelvin

As solid Matter is highly divisible its likely these orbits have very much less diameter than the smallest Wave length of vibrations or disturbances in the

The Aether of Space,

From all this it is probable that not
Matter is being constantly formed
in space, that it is also being
aggregated together to large bodies

Now for Matter,
Perhaps these microscopic orbits
containing 1 or more ether particles
they in time might have contracted
so that 1 or more might come nearly in
Contact & form a spherical consisting
of 1 particle which is imperceptable
but there could be say 3 particles
finally each contract of this
would form 1 particle rotating on
an axis Then 4 5 6 & so
on, or 2 4 6 8 10 etc Even
numbers or 200 or more

Some of these agregations could
rotate in one direction & some
in another

Those which are the most dense would resist the Ether particles passing between the Ether particles aggregate the most + would be attracted to the Earth the most, as bombarding Velocity Commun then the Earth would be lower than then the particles recieves from space

When we apply energy to this matter, it throws trains of waves due to disturbance of their orbits of matter,

If we fill a jar with a gas at a certain temp and at atmospheric pressure, The molecules will press on the inside of the jar 1 atmos being the same as outside This pressure is due to the ether particles bombarding the gas whorls as the bombardment comes

from every direction the whorls
will move in every direction & put
pressure on the immobile whorls
of the glass vessel
If we now double the whorls
by pumping in more gas +
the whole die at atmospheric
pressure. Then the pressure
in the jar will be one atmosphere
pressure higher because in
this case there will be twice
as many molecules of gas
in the same space & the
Etheric particles will make
twice as many bombardments
doubling the pressure
But the energy is not the
same as to get twice as much
gas in energy was required
this caused a lot of heat waves
to be thrown into the passing
Ether particles which went
out into space and lost
until this group of waves
struck solid matter
If now the outlet to the

air is opened the gas expands + absorbs heat from its surrounding & the device by a proper Engine the would give back power, ~~or~~ energy potential or Kinetic — if Kinetic the whole on compression or Expansion would go out the Ether into space as a train of radient heat waves While the Cooled adjacent air would absorb radient heat trains of waves from space until Conditions were as when started.

The whole of the ether particles of space going in every direction as Vel of light as not a source of Energy under the Conditions we exist in. there is a slight degradation of its Energy of motion when it passed thru the Earth but this cannot be utilized except perhaps in the Case of such

an immense mass as our Sun
Where a loss of velocity even slightly
would tend to prevent the present
temperature of the sun from ever
falling.

The Energy can use as all
in the form of trains of waves
thrown on the Ether bathing
from changes in Solid matter
therefore the heat & light trains of
waves from the sun acting on solid
matter on our Earth is our
only source,

If in a closed Vessel there is a
gas and is cooled down to a
point just before some condensation
into liquid starts, & the wheels
are a considerable distance apart
& the Ether particles from space
pass freely & there is little shielding
of one wheel by the other hence
not much pressing of the wheels
together, If we now put pressure

on the gas the space is diminished & the ether particles press the whorls closer until they coalesce & some condense to a liquid, in this state the pressure on the whorls are very great, then we increase the pressure on portion until its wholly liquid, the whorls are now very close together & held there after losing their heat to cooling mixture,

Now while in liquid state we still further reduce the temperature then the bombardment or pressure of the ether particles forces the liquid to become solid,

Note 1 gram of Li & 1 gram Uranium require the same amount of heat to raise them 1° Cent. in fact all metals same except Be

note

Note. Spectroscope from NaCl flame shows Na flame — Millikan School physics says if a second source of NaCl vapor or a 2nd flame is put in line with the slot that the Sodium line now will be black as the Na flame nearest the slot will absorb it — This is the explanation of dark lines from the sun

Make a test of this arrange the 2 flames so they can be advanced or rather 1 flame fixed before the slit of spectroscope. Then advance the other flame towards the fixed flame as she of this holds good up to actual coalescence of the 2 flames into a single flame

Feby 19 1920

It appears to me as if light vibrating from 400 to 800 million million times that it improbable that the Optic nerve fibres conduct vibrations of this tremendous rapidity.
I think the Effect of light on the Ends of the fibres causes a local action at the tips by fluorescence which is transmitted along the fibres & the image appears in the brain designed for observing as a fluorescent picture. Those who have blind to one color, has an impaired plan which fails to supply phosphorescent Matter fluorescing green or blue etc
We know that the image is retained 1/40 of a second after light is cut off & this makes it certain that the colorado Optical system is based on fluorescence or phosphorescent. I believe the organized beings which live in the Cell, actually observe moving pictures

I think the ear will be found to have an action similar to the perceptions of vision —
If a siren had holes spaced to give say 2000 per second that a group of holes severed off would not be noticed by the Ear —
The action of musical sound is due to the fact that each wave following is an exact replica of it & it requires a number of replica to be received before sound is realized by the brain & after the first replica has been emitted the sound continues to be heard by the brain.
This would certainly take place if the Rods of Corti were actual tuned hairs because it would take many replicas to bring them to full amplitude & they would gradually die down when stimuli ceased.

6 — slope to 3
6" open
3
4
1
330
1"
2
4"
6

406

Theodore Edison

Theodore Edison

(468)

Theodore
Edison.
1906.
NOVEMBER
18.

Notebook, N-08-01-20

This notebook covers the period April-May 1907. All entries are by Edison. The book contains logs of storage battery cell tests and notes regarding the preparation and loading of nickel flake in the cell grids. It appears to have been used primarily at Fort Myers, Florida. At the beginning of the book, Edison's youngest son, Theodore, signed his name in November 1906. The pages are unnumbered. Approximately 80 pages have been used.

Theodo
Edison
1906
NOVEMBER
81.

William H. Hasse
... STATIONER.
Good Work Pro
68 WILLIAM STREE
NEW YORK.

Account for fact that with 2000 flake Went off 6 a on

3000 " " "

4000

5000

6000

7000

8000

Hot Runs	Max flake
50	92+8
100	89+11
150	85+15
200	81+19
250	78+22
300	75+25
350 -	73+27

Account for Reversal of 350 tubes on 450 Run which Capacity was greatly increased ~~that~~ this Capacity was held for 200 or more hot runs to wit 359 360 361 to 373

Account for fact that Co Cobalt plated tubes were very much lower capacity after many hot runs than Nickel plated tubes —

Holland Efficiency

from Off pump

6 hours	7 hours	10 hours		amp Chg 6 hrs	amp 7 Hrs	amp 10 Hrs
740	856	929				
810	857	922				
805	852	937	929	66	61	46.5
845	894	967				
850	902	955				
842	886	947	956	70	64	47.8
780	945	922				
800	843	915				
775	837	908	915	65.5	60	45.7
774	840	957				
813	878	975				
825	866	995	976	67	61.5	48.8
820	878	921				
823	882	877				
823	870	910	904	68.5	62.5	45.5
800	830	750	004			
856	907	950				
827	868	900	925	70	63	46
816	860	893				
875	870	920				
823	863	905	906	68.5	62	45.5
857	910	952				
848	899	947				
847	892	947	949	70.5	64.5	47.5

Holland Efficiency Tests Tubes

Wellington

Ducky 150 – Chg 200

		3 hours Chg Time	4 hours	5 hours	Stop watch	Efficiency
21 # .005 J 1/2 4 Rings	5398	515	620	723	53.1	
	5399	517	640	735	54.6	
4.32	5400	517	632	723	52.5	53.4
21 Hole .005 Spiral –	5401	537	663	768	57.3	
	5402	537	666	768	57.4	
4.42	5403	535	663	763	57.1	57.3
26x30 .005	5404	522	635	725	53.9	
	5405	527	638	728	53.8	
4.26	5406	522	625	724	53.6	53.8
26x30 Spiral	5407	492	600	697	51.1	
	5408	510	625	725	53.1	
4.49	5409	510	635	740	54.1	52.7
Punched Hole	5410	535	657	750	55.6	
	5411	535	657	749	56.3	
4.42	5412	537	668	761	57.1	56.3
Punched Spiral	5413	515	325?	725	—	
	5414	520	677	777	57.1	
4.51	5415	542	671	766	57.6	57.3
2400. .005	5416	535	647	747	56	
	5417	537	660	758	56.8	
4.28	5418	537	655	747	56.1	56.3
2400 .005 Spiral	5419	537	673	778	58.6	
	5420	540	670	772	57.9	
4.48	5421	542	670	771	57.9	58.1

6hour	7Hour	10hour		Effy 6	Effy 7	Effy 10
787	861	997				
798	867	998				
772	842	980	991	65.5	61	49.5
772	827	925				
787	845	931				
791	850	940	932	65	60	46.5
795	873	1032				
806	882	1040				
770	843	995	1022	66	62	51
871	942	1080				
858	925	1076				
857	922	1058	1071	72	66.5	53.5
735	806	922				
765	836	966	944	62.5	58.5	47
700	760	840	840	58	54	42
818	878	970				
822	881	952				
832	887	950	937	68.5	63	47.8
805	837	935				
847	867	923				
825	857	946				
762	792	925				
672	810	972				
827	861	967				

2nd Lot (Cuba Holland Economy Coal) 200 cfm 150 deg

	2 Hour	3 hour	4 hour	5 hour	Water
No wash not fit low heat. 26x30 Spiral	5586	377	505	607	712	52.9
	5587	376	513	618	721	53.4
5.26	5588	367	510	602	700	52
21 Hole .005 Spiral No wash not fit low heat.	5589	372	513	616	707	53.1
	5590	377	527	631	718	54.1
5.17	5591	377	525	630	730	55.1
1/2 wash not fit low heat 26x30 .005 Spiral	5598	375	508	610	717	53
	5599	375	511	615	722	53.4
5.37	5600	368	500	602	702	51.7
21 Hole .005 Spiral 1/2 wash not fit low heat	5601	385	548	667	775	57.8
	5602	385	537	657	765	56.6
5.43	5603	385	537	660	765	56.6
1/2 wash not fit High heat Spiral 26x30	5604	352	492	587	687	51
	5605	370	495	597	696	50.9
21 Hole same as 5604 5.09	5606	349	492	567	665	49.8
Reg wash filtered dried Low heat, 26x30 Spiral	5609	387	525	637	738	53.8
	5610	387	540	647	746	54.2
4.77	5611	387	540	653	753	55.1
21 Hole Reg wash filtered dried low heat Spiral	5612	372	500	641	723	52.4
	5613	386	523	677	757	55.2
4.66	5614	381	515	658	743	52.7
Reg no wash not filtered dried high heat 26x30	5615	371	478	615	692	49.6
	5616	375	496	462	542	38.1
4.60	5617	377	505	652	740	53.1

6	7	10 hours
792	820	897
786	817	893
756	790	860
800	822	887
812	845	895
802	820	863
645	711	807
677	717	797
692	725	837

		2 Hour	3	4			
Reg no wash not followed dried high heat 26X30. spiral - 4.61	5618	372	501	635	717	51.4
	5619	377	497	642	712	50.5
	5620	370	491	617	698	49.2
Reg number wash not followed dried low heat. 26X30 - spiral	5621	380	508	646	723	51.4
	5622	378	516	662	742	53.1
	5623	382	518	663	746	53.1
No wash not followed Dried high heat, 21 Hole 005 Spiral	5624	345	440	547	617	42.6
	5625	345	437	548	620	44.4
	5626	345	446	553	625	44.8

1/2 wash not followed dried low heat no heat green on about loads.

21 Hole 005 Spiral heat tubs,

Told Holland Change a cold 6 or 7 hours hot at 135 then put Mi tube in Cold 21 with fresh chip 75 + put 75 in Cold Kot with fresh chip Mi + see which loads Capacity by heat -

Spec gravity

	NaOH	KOH
10%	1·012	1·083
15%	1·170	1·128
20%	1·225	1·177
25%	1·279	1·230
30%	1·332	1·288

NaOH less volatile than KOH.
Electric positive Rb. Cs K Na Li

KOH from Alcohol always contains KCl + K_2CO_3
also K acetate from action of KOH on the alcohol

Na metal not attacked by Bromine
K takes fire therein
Na Can be fused with Iodine
K Explodes when thus fused
Na immersed in Aniline even boiling not attacked
K acts violently on Aniline
Bismuth Potassium Thiosulphate a precipitate
Na forms no read salt or precip
K forms K_2O K_2O_2 K_2O_4
Na " Na_2O Na_2O_2

Hot conc sol KOH deposits on cooling a hydrate $KOH, 2H_2O$
Na Spec g 1.385 Cooled to freezing point deposits a hydrate $2NaOH, 7H_2O$ –

KOH salts precipd by Perchloric acid Tartaric acid, Platinum Chloride, & form crystals of alum with Aluminum Sulphate
NaOH salts forms no precip or gives an alum with above reagents –

Acid Metaantimonate K gives white precip of Metaantimonate Sodium even diluted 1/1000 –

LiOH absorbs CO_2 from air more slowly than NaOH
$LiOH + H_2O$ is the Hydrate,
Li_2CO_3 only slightly soluble in water.
100 H_2O dis 0.769 pts. at 13. 7.78 at 100°

K_2CO_3 is deliquescent
Na_2CO_3 is not deliquescent.

Soda Soaps are invariably harder than K Soaps with the same materials –
K soaps are more soluble – H2O than Na Soaps

All distilled water contains ammonia.
To detect add very small quantity Cupric Sulphate to distilled water - when this is diluted with more distilled water a greenish tinge is given depositing a basic Cupric Sulfate,

gid set tubes

2 Hours 200

5612	372
5613	386
5614	381
5615	371
5616	375
5617	379
5618	372
5619	377
5620	370
5621	380
5622	378
5623	382
5624	375
5625	373
5626	349

Equiv on New 4 pole Cell 120 Cycles

24 amp hours at (HR)	32 Rate	40 Rate	48 Rate
	Cap amp		
124	113.7	107.5	100.1
123.6	115.2	111.3	105.4
125.6	114.2	107	99.5
133.1	122.8	117.9	116.
118.2	109.2	102	96.3
131.8	119.3	108	109.4

Boxes

Charge all cases 1000 mile hours points just amp 7/04 not by Capacity

	Chg 6 3/4 at 1.60	Chg 5 hour 2.10	Chg 4 hour 2.50	Chg 3 1/2 at 3.00	* Not when chg
5586	78.2	71.2	67.0	61.8	
5587	78.7	72.1	68.5	64.0	
5588	77.0	70.0	66.2	62.0	
5589	76.5	70.7	68.7	66.0	
5590	77.0	71.8	69.5	65.7	
5591	78.5	73.5	70.7	64.8	
5598	79.0	71.7	66.6	62.2	
5599	79.5	72.2	68.0	63.7	
5600	77.0	70.2	66.0	60.7	
5601	84.0	77.5	75.0	70.0	
5602	83.1	71.5	73.0	77.7	
5603	82.5	76.5	50.0	61.7*	
5604	74.8	68.7	65.0	61.7	
5605	76.8	69.6	65.7	62.0	
5606½	70.2	66.5	60.7	57.0	
5609	81.7	73.8	60.5	66.7	
5610	82.2	74.6	69.6	68.7	
5611	83.1	75.3	72.3	69.7	

Cell 5603 developed low voltage curve which cut by the 1 Volt line on the horizontal part therefore an small variation in charge voltage from temp changes or other causes makes a great difference in amp hrs equal to 1 Volt, Those last two runs which are high made on very warm days –

Low V of 5603 not caused by bad contact because chg voltage was also low the run is OK seems to be to be a bad defect in tube check

it appeared in 5413 Lot 1 & 5616 & 5624

Chgd 1000 ml amp

	6½ hrs 1500	5 hrs 2000	4½ hrs 2500	3½ hrs 3000		
5612	78.3	72.3	69.7	64.8		
5613	80.2	75.7	73.7	71.7		
5614	79.5	74.3	71.6	67.6		
5615	76.8	69.2	66.1	61.2		
5616	55.0	54.2	65.5	70.7	?	
5617	79.5	74.0	70.7	67.0		
5618	77.5	71.7	69.6	65.7		
5619	77.7	71.2	69.5	64.7		
5620	74.8	69.8	66.3	62.8		
5621	78.2	72.3	70.1	65.3		
5622	79.2	74.2	71.8	68.0		
5623	78.5	73.2	71.7	68.5		
5624	55.0	61.7	58.2	54.8		
5625	66.5	62	58.7	54.7		
5626	68.2	62.5	59.5	55.2		

Note: Three tubes often a long
Change in concentration gives very than
15% - give an accounting of length
Yellows gap as high as 465
for 400 put in —
465 being for 27% 27. 21 & 15
bring the 3 points 27% 460 - interpolated
Start 402 then 21 gives, 425 -
interpolation 404 @ 18% then
15% 350@360 - going on 4th day to 398

Chg 200.50 dur 150

4th Leaf Tubes various % NaOH

4th run

	2 Hours	3	4	5	6	7	10
21 Hours 1½ spent 2½ not to be 24 to ½ washed full dur hour	5876	382	495	610	720	793	830	943
27% NaOH	5877	392	505	625	742	813	867	970
	5878	365	475	587	700	765	823	932
25% NaOH	5879	400	525	646	767	837	900	970
	5880	400	522	632	756	832	882	995
	5881	393	516	628	756	832	882	997
23% NaOH	5882	400	543	658	782	847	920	1025
	5883	393	515	623	743	817	867	967
	5884	395	518	622	740	815	867	972
21% NaOH	5885	390	518	630	745	825	875	995
	5886	396	536	652	775	860	920	1025
	5887	400	536	647	765	843	900	1012
19% NaOH	5888	396	542	661	783	870	932	1050
	5889	398	535	650	771	863	922	1050
	5890	391	538	661	775	862	923	1067
17% NaOH	5891	373	520	623	722	812	875	1030
	5892	397	557	680	801	890	950	1100
	5893	397	546	666	773	865	925	1070
15% NaOH	5894	398	527	642	751	841	907	1068
	5895	397	557	690	807	907	962	1100
	5896	385	532	645	751	840	902	1067
13% NaOH	5897	398	541	662	770	865	927	1073
	5898	398	533	662	763	857	917	1075
	5899	398	540	657	751	850	910	1070

With the new filler on little machine, single tamp we have been making allow tubes with up to May 1907 – We put in a revolving shaft with 2 arms in bottom of flake hopper –
Made 2 tubes with cup set for 10 flake 24 green

Weight No 1 mix 7283 – 10 to 24
2 " 7356 –

Removed mix & dissolved out green by KCy – Weight flake
No 1 1.954
No 2 2.063 –

Put back green 10 to 24 The weights showed 6%
No 1 2.184 – 230 mg/shy 10%
No 2 2.206 – 143 " 6.5%

Altered Cup to feed 10 flake 31 green
Weight No 3 mix 7114
No 4 " 7046

Dissolved out green by KCy – Weight flake
No 3 1.699
4 1.677

Showed have got No 3 17.78 – 75 mg 5%/shy
4 1761 84 " 5%/shy

LiOH 2 grams to 175 cc 21% good — on hot test

Same as above with 5 to 8 grams K_2CO_3 added is better —

Green soaked in Sol of Bi hydrox in NH_4Cl then dried + boiled in KOH 5% then washed free KOH is good also with LiOH + better than Reg 21% K without LiOH ie stimulates up —

But 15% NaOH 3 Na_2CO_3 2 Li0 is bad

Nitrates are very bad —

Also Silicate K to extent of 5 grams is bad + compares with Borate + Aluminate —

1st 50 H of new Companion Set KOH + NaOH

% KOH	+ NaOH KOH. 50 R	NaOH. 50 R	Dif	% NaOH Ions
33	718	324	—	42.9
31	646	718	+72	40.3
29	820	855	.35	37.7
27	844	998	154	35.1
25	905	991	86	32.5
23	899	1005	106	29.9
21	904	993	89	27.3
19	933	905	= 28	24.7
17	931	907	= 24	22.1
15	915	907	= 8	19.5
13	881	903	+ 22	16.9
11	855	914	59	14.3
9	813	877	64	11.7
7	—	830		

Gut

Lithia

21% KOH. in which Lithium hydroxide is dissolved to saturation contains in 100 cc 2.8886 miligrms LiOH.

In 15% NaOH. saturated with LiOH. contains 3.2936 milgms —

A 3 inch reg tube filled in Single Tamp machine, which we have used to make all the test cells up to date, April 30th 1907. gave on a test thus

1/2 wash not filtered dried low heat, Reg 0001
Ni flake 21 hole 005 3½ wt 4 rings
10 flake 24 green thru 20 mesh.

Total weight 8.868
Wt tube & caps 2.081
6 787

Weight of flake found by dissolving green out by KCy
1.192 milg — Wt should have been 2.034.
1020 of 842 milg — this is 6 flake 24 green

Long Tube Total wt 13254
Wt Tube & bottom 2451
10 803

Wt flake found 3.375
on basis of 10 of 24 green should have been a shade less to 10.3 flake to 24 or nearly perfect.

Phenomenon #

Sodium Oleate little Sol in 21% KOH.
" almost Insol in 21% KOH Sat with LiOH

K Oleate Sol in 21% KOH.
Very little dis in 21% KOH saturated LiOH.

Na Oleate Sol KOH. 21%
also Sol with 21% Sat LiOH.

K Oleate Sol 21% KOH.
also 21% Sat LiOH.
but not so easy as KOH only

Entered –

		No	Cap Zero Inches	Time	Volts	amp	Watt
80 Fe 15 Cu 5 Zn (non pyro) 5% H_2O		3013	1210	5	73	80.6	58.8
		3014	1255		73.9	83.6	61.7
80 Fe 15 Cu 5 Zn Self H. 5% H_2O		3015	1170	"	73.4	78	57.2
		3016	1147		73.5	76.5	56.2
60 Fe 40 Cd Non Pyro – 5% H_2O		3023	1340	"	74	89.3	66.1
		3024	—		Powder spl.		
60 Fe 40 Cd No H_2O non pyro		3025	1335	"	75.1	89	66.8
		3026	1297		75.5	86.5	65.3
80 Fe 20 Cu 5 Sn 5% H_2O Self H.		3027	1035	"	75.1	69	51.8
		3028	1042		74.5	69.5	51.7
90 Fe 10 Wo 5% H_2O Non Pyro		3219	1165	"	73.2	77.6	56.8
		3220	1150		73.1	76.6	56
90 Fe 10 Wo Self H.		3221	1150	"	73.7	76.6	56.4
		3222	1090		72.6	72.6	52.7
80 Fe 15 Cu 5 Sb 5% H_2O Self H.		3235	1275	"	75.3	85	64
		3236	1285		75.3	85.6	64.5
80 Fe 15 Cu 5 Sb – non pyro 5% H_2O		3249	1250	"	74.5	83.5	62.2
		3250	1295		74.9	86.3	64.6
85 Fe 15 Wo bronze (yellow)		3269	1092	"	74.1	72.8	53.9
		3270	1150		74.6	76.6	57.1
90 Fe 10 WO non pyro 5% H_2O Dry		3275	1215		75.1	81	60.5
		3276	1125		75.2	81.6	61.3
—		3279	1140		76.2	76	57.9
		3280	1190		76.4	79.3	606
Fe 85 WO 15 (Black) Non pyro – 5% H_2O		3281	1100	6 gr	75	73.3	54.9
		3282	1092		75.1	72.8	54.6

Ent

	No	Capacity 5 hr rate	amp	Voltage	Amp	Watt	in 1½ inch, Amp	Watt
72 oz Cu 15 Cd 5% non pyro 5% H2O	3283	1087	5.5	75	72.5	54.3		
	3284	1087		76.7	72.5	55.6		
70 oz 30% WO Yellow Prompt non pyro 5% H2O	3289	1017	5	74.3	67.8	50.3		
	3290	1097		74.9	73.1	54.7		
80 oz 15 Cu & Cd ecch Heat 5% H2O	3291	1022	5.5	76.7	68.1	52.2		
	3292	1040		76.8	69.3	53.2		
80 oz 20 Sb Prime non pyro 5% H2O	3295	1180	5	73.3	79.6	58.3		
	3296	1175		72.9	78.3	57.1		
80 oz 20 Wo Yellow Prompt non pyro 5% H2O	3299	1115	5	73.7	74.3	54.7		
	3300	1062		74	70.8	52.3		
75 oz 25 Wo Blue Prompt non pyro non pyro 5% H2O	3313	1115	5	74.7	74.3	55.5		
	3314	1045		74.5	69.6	51.8		
75 oz 25 Wo Yellow Prompt non pyro 5% H2O	3315	1092	5	73.6	72.8	53.6		
	3316	1090		74.3	72.6	53.9		
D.T.G. 135 Self heating 80 oz WO 20 Ex H2O (yellow Prompt)	3319	1080	5	74.3	72	53.5		
	3320	1147		74.5	76.5	57		
D.T.G. 138 Self H. 75 oz 25 WO blue oxide Ex H2O	3333	1030	5	74.2	68.6	50.8		
	3334	1100		75	73.3	54.9		
D.T.G. 99 72 oz WO 10 5% H2O	3335	1295	5	76.2	86.5	65.9	88.3	
	3336	1310		76.6	87.3	66.8	88.8	
D.T.G. 153 non pyro 72 oz WO 10 Red Prompt 5% H2O	3337	1160	6	75.1	77.3	58.1		
	3338	1150		73.9	76.6	56.6		
D.T.G. 187 non pyro 85 oz 15 Sb 5% H2O	3341	1195	5	74.4	79.6	59.1		
	3342	1170		74.4	78	58.1		

5 hour chg 300 ma

		Tri		Volt	amp	watt	16/watt amp	watt
G-139. sulph. 80 Hg 20 Wo blue oxide 5 Hgo —	3343	1167	5	75.9	77.8	59		
	3344	1160		75.6	77.3	58.4		
G-148 Nun pyro 72 95 Wo 5 blue ox 5 Hgo —	3349	1085	5	73.4	72.3	53		
	3350	1040		73	69.3	50.6		
G-89 Nun pyro 95 Hg 5 Sb 5 Hgo —	3351	1112	6	75.6	74.1	56	81.6	
	3352	1125		75.8	75	56.9	82	
	3359	1097			73.1		80.6	
	3360	1110			74		82.1	
	3369	975			65		81	
	3370	1172		74.2	78.1	57.9	84.6	
	3375	1025			68.3			
	3376	1030			68.6			
	3377	1160		74.1	77.3	57.3	86	
	3378	1125		74.8	75	56.1	85	
	3387	1035			69			
	3388	1050			70			
	3389	1160		72.7	77.3	56.1	85.3	
	3390	1157		73.1	77.1	56.3	85	
	3397	1200		73.9	80	59.1	89	
	3398	1240		73.3	82.6	60.5	89	
	3406	1125		75.2	75	56.4	84.3	pasted, split
	3407	995			66.3			
	3414	1035			69			
	3417	1175		74.6	78.3	58.4		
	3418	1012						

See further along

		rpm		S/G Volt	S/G amp	S/G Watt	10% Resist 2mg
3419	1085				72.3		
3420	915				61		
3421	1010				67.3		85.5
3422	1080				72		87.3
3425	1040				69.3		
3426	990	9r	Hesy		66.		
3500	1175	5			78		
3504	1175	5			78		
3505	1000	5			66		
3506	990	5			66		
3491	1049	4	4	74.4	87.2	64.9	
3492	1012	4	4	74.8	84.4	63.1	
3497	1042	4	4	76.3	86.8	66.2	
3498	1074	4	4	74.3	85.8	63.7	
3509	850	4	4	70.8			
3510	880	4	4	66.7			
3511	885	4	4	73.8			
3512	875	4	4	72.9			
3591	887	3.5	3.5	75.6	84.5	63.9	
3592	892	3.5	3.5	75.2	85	63.9	
3593	795	4	4	75.2	75.7		
3594	757	5	5		72.2		
3533	827	5	5		68.9		
3534	730	5	5		60.8		
3545	1000	5	5		64		
3546	1037	5	5		66.2		

Viscosity at 25 Cent of KOH + NaOH.

Water = 32.6 average time

% NaOH	1st Time in Seconds	2nd Time	Average Time in Seconds	Viscosity	Sp. g
15	36.2	36	36.1	1.1074	1.166
17	37.2	37.2	37.2	1.1411	1.188
19	38.4	38.4	38.4	1.1781	1.209
21	39.6	39.8	39.7	1.2178	1.232
23	40.6	40.8	40.7	1.2484	1.254
25	42.8	42.4	42.6	1.3067	1.275
27	45	45	45	1.3804	1.290
33	61.2	61.2	61.2	1.8466	1.359
% KOH					
9	32.6	32.4	32.5	0.9966	1.070
11	32.4	32.6	32.5	0.9966	1.088
13	32.6	32.8	32.7	1.0030	1.107
15	33	32.6	32.8	1.0061	1.124
17	33	33.2	33.1	1.0153	1.142
19	33.2	33.4	33.3	1.0215	1.162
21	33.8	33.6	33.7	1.0337	1.184
23	33.6	33.6	33.6	1.0307	1.204
25	34	34	34	1.0429	1.225
27	34.4	34.4	34.4	1.0552	1.247
33	35	35	35	1.0736	1.319

Ent

greater viscosity of Na at 15 than KOH 21
showing solute molecules
above NaOH is more hydrated
thus interfering
better conductor

Viscosity 21% KOH — 1.0391 but with
2.8586 LiOH, its viscosity is 1.126

15% NaOH, 1.119 - ~~[illegible]~~ saturated with
LiOH, 3.296 gms its viscosity is 1.292

Only

Experiments by Holland

Small cell Nickel strips (18) blank picks
½ inch apart 1000 milamp between
90 cc following % KOH - Thermom in
Each cell. Run Each % 2 hours -

KOH			NaOH		
15	rise	10.3 Fahr	15	Rise	8.6 Fahr
17	"	10.6	17	—	9.5
19		11.5	19	—	8.7
21	—	11.3	21	—	8.7
23	—	12.5	23	—	8.8
25		10.9	25	—	8.9
27		10.6	27	—	8

With same % KOH but with 2 gms LiOH in each

15	11.0 Fahr
17	9.7
19	11.2
21 —	10.9
23	10.9
25 —	11.9
27	10.1

NaOH being more hydrolized
according to new theory
should be better conductor.

Capacity to 1 Volt on 5 hour chg @ 300 of 1 grams in NaOH

		Ohms	Volts	Amps	Watts		
2930	16% NaOH	1380	74.6	92	68.6		
2931		1350	72.9	90	65.6		
3023		1345	73.6	89.6	65.9		
3028		1317	72.1	87.8	63.3		
3026		1316	74.5	87.3	65		
3143		1272	73.7	84.8	62.5		
3144		1290	74.7	86	64.2		
3145		1275	74.7	85	63.5		
3195	21% NaOH	1400	72.4	93.3	68.4		
3196		1440	74.8	96	71.8		
3235		1400	73.4	93.3	68.4		
3236		1387	73.3	92.5	67.8		
3213	13% NaOH	1357	71	90.5	64.3		
3214		1360	72.4	90.6	65.6		
3249		1190	72.9	79.3	57.7		
3250		1250	73	83.3	60.8		

End

Prono all changed a discharg 300 ml amp per gram

		9mo					
	3453	5	5 hour	887	59.1		
	3454	5	"	865	57.6		
	3457	5	"	900	60		
	3458	5	"	857	57.1		
	3463	4.5	4½ h	950	70.4		
	3464	4.5	"	922	68.3		
	3441	4	4 "	825	68.8		
	3442	4	4 "	827	68.9		
	3447	"	"	900	75		
	3448	"	"	875	74.6		
	3449	"	"	830	69.2		
	3450			832	69.4		
	3451	"	"	875	72.9		
	3452			852	71		
	3455	"	"	810	67.5		
	3456			835	69.6		
	3467	"	"	875	72.9		
	3468			852	71		
	3471	"	"	782	65.2		
	3472			785	65.4		
L.O. 8076 2024	3481	"	"	1007	83.8	75.8	63.5
	3482			995	82.9	75.9	62.9
	3459	3	3 hrs	889	74.1		
	3460	"	"	857	71.4		
	3469	"	"	807	67.5		
	3470	"	"	802	70.2		
Ch. Ferrous Ammon Sulfate	3475	"	"	1067	85.3	76.8	65.5
	3476			1070	88.6	77.6	64.7
	3547	5	5 hrs	1037	69.1		
	3548			1050	70		

Cut

after 25 Rise of Voltage nearly directly as Concentration diminishes —

Overcharge Tubes Lot 4 — NaOH —

NaOH		Run 6 IV	Run 6 To .5V	Run 7 IV	Run 7 To .5V	Run 8 IV	avg Volts
27%	5876	987	1192	850	1197	1000	1.10 Volt
	5877	1062	1235	963	1235	1087	
	5878	1050	1230	920	1230	1067	
		1033	1219	911	1231	1051	
25%	5879	1087	1266	1065	1287	1162	1.137
	5880	1100	1307	1068	1292	1171	
	5881	1125	1327	1075	1290	1191	
		1104	1298	1069	1289	1181	
23%	5882	1086	1327	1090	1320	1170	1.157
	5883	1000	1262	976	1257	1087	
	5884	1023	1292	1000	1267	1100	
		1034	1294	1022	1281	1119	
21%	5885	1035	1215	1000	1227	1090	1.177
	5886	1092	1270	1070	1270	1132	
	5887	1080	1260	1036	1250	1100	
		1089	1258	1035	1249	1107	
19%	5888	1125	1270	1120	1275	1160	1.120
	5889	1125	1267	1111	1271	1160	
	5890	1110	1265	1100	1270	1150	
		1120	1267	1110	1272	1157	
17%	5891	1087	1205	1087	1222	1137	1.212
	5892	1167	1272	1167	1282	1195	
	5893	1137	1247	1142	1245	1185	
		1130	1261	1132	1250	1172	
15%	5894	1142	1215	1150	1232	1185	1.222
	5895	1195	1255	1195	1267	1207	
	5896	1137	1210	1142	1225	1162	
		1156	1227	1162	1241	1185	
13%	5897	1150	1192	1157	1192	1187	1.237
	5898	1163	1205	1170	1210	1187	
	5899	1180	1215	1187	1225	1197	
		1164	1204	1171	1209	1190	

Here are the long charge runs given these tubes discharging to .50 Volt instead of taking off at 1 V. Though you might get mixed of you only did the 1 Volt

The capacity at .5 V is practically constant for all concentrations except highest & lowest operational Cap is at 15% which has the same number runs as 21% KOH.

No	grow	Hours	Crop V	Aug %	Veg %	Wt %
3553	5	5-Mar 300	960	64		
3554	5	"	992	66.1		
3557	5	"	895	59.6		
3558	5	"	850	56.6		
3559	"	"	1000	66.6		
3560	"	"	1050	70.		
3561	"	"	900	60		
3562	"	"	1000	66.6		
3563	"	"	895	59.6		
3564	"	"	900	60		
3565	"	"	840	56		
3566	"	"	840	56		
3571	"	"	1000	66.6		
3572	"	"	1030	68.2		
3573	"	"	1075	71.6		
3574	"	"	1030	68.6		
3581	"	"	560	37.3		
3582	"	"	560	37.3		
3584	"	"	370	24.6		
3585	"	"	370	24.6		
3589	"	"	1035	69		
3590	"	"	1050	70.		
3607	3.5		952	90	75	68.1
3608	"		955	91	758	68.9
3609	4		1050	87.5	762	66.7
3610	"		1080	90	75.2	67.5

Gut

Cut

Vol	grm		Capacity	Volts	Amps	Watt
3645	4		695		57.9	
3646	4		650		54.1	
3643	4.5		1075		79.6	
3644	"		1085		80.4	
3595	5		1245	73.8	83	61
3596	5		1275	74.1	85	63
3597	5		1217	75.4	81.1	61.1
3598	5		1197	73.8	79.8	58.9
3647	"		815		54.3	
3648	"		975		65	
3659	"		1285	75.8	85.6	64.9
3660	"		1275	75.8	85	64.4
3661	"		1000		66.6	
3662	"		930		62	

following are from 16% NaOH 4 in tubes
5 Hour chg 300

3335			1325	73.6	88.3	65
3336			1332	72.8	88.8	64.6
3351			1225	73.3	81.6	59.8
3352			1230	71.1	82	58.3
3359			1210	72.5	80.6	58.3
3360			1232	72.3	82.1	58.4
3369			1215	72.5	81	58.7
3370			1217	72.6	84.6	61.4
3371			1290	73	86	62.8
3378			1275	73.1	85	62.1

no	gm	Cap	Vefg	Amp-E	Waste
16% NaOH 5 hour chg (continued)					
3389		1250	72	85.3	61.4
3390		1277	71.9	85.1	61.1
3397		1335	72.4	89	64.4
3398		1337	71.7	89.1	63.9
3421		1282	71.8	85.5	61.4
3422		1310	72.2	87.3	63.
3491	4	1100	72.7	91.6	66.6
3492	"	1080	73	90	65.6
3497	"	1050	74.6	87.5	65.3
3498	"	1042	71.9	86.6	62.2
3503	5	1265	72.2	84.3	60.8
3504	"	1250	73	83.3	60.8
3505	"	1005		67	
3506	"	1075		71.6	
3509	4	900		75	
3510	"	900		75	
3511	"	907		75.6	
3512		900		75	

Chg 300 per grain -

		Cap	V.E	AH	WH
3669	4	992	74.6	82.7	61.7
3670	4	950	74.2	79.1	58.7
3671	4	940		78.3	
3672	4	937		78.1	
3673	5	1225	73.3	81.6	59.8
3674	5	1225	73.9	81.6	60.3
3675	5	1285	72.	85.6	61.6
3676	5	1285	72.1	85.6	61.7
3681	4	992	76.1	82.7	62.9
3682	4	952	74.6	81.7	61.1
3683	4	975	76	81.3	61.5
3684	4	975	76.9	81.3	62.5
3697	5	1250	72.9	83.3	60.6
3698	5	1250	73.8	83.3	61.4
3699	4	1037	76.2	86.4	65.9
3700	4	1040	75.9	86.6	65.7
3725	5	1320	75.5	88	66.4
3726	5	1275	75.3	85	64
3727	5	1277	74.6	85.1	63.5
3728	5	1310	76.3	87.3	66.6
3733	4.5	985		73.	
3734	"	970		71.8	
3735	5	1240	74.6	82.6	61.6
3736	5	1185	74.7	79	59.1
3745	5	1237	73.4	82.5	60.6
3746	5	1225	73.9	81.6	60.2

Blanks & Grids in E18 - Temperatures produced by passing 30 40 & 50 amperes through 2 1/2 ROHL.

30 amp rate.

Temp air	Temp cell			Diff
73 -	72.5			= 3
75	84.5	25	amp hours	+ 9.5
75	94	50	"	19
74.5	98	75	"	22.5
73	101.5	100	"	28.5
76.5	105.2	125	"	28.7
78	108	150	"	30
80	111	175	"	31
80.5	112	200	"	31.5
80.5	114	225	"	33.5

40 & 50 about same but after 75 amp 50 rate gives above at 100 to 105

125 " 110

150 114

175 116.5

200 118

225 120

This [illegible] E18 № 15500
24 [illegible] in each [illegible] rate
of 30 [illegible] 450 [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
80	76	80		75		0

If we charge an E 18. at
30 amp heat at end 22.5 be 12° above atmos.
40 " 17.5 " "
50 " 23.7 " "
Do its very desirable to charge a low rate for heat reasons.

Ent

Hot Ent

Charge temp Reg E 18 no 15500

30 amp charge

Temp air	Cell.		Def
73.5	72.2	0	=1.3
75	77.	25 amp	+2
75	80	50 "	5
74.3	82	75 "	7.7
73	83.5	100 "	10.5
76.5	85	125 "	8.5
78	87	150 "	9
79.5	89	175 "	9.5
80.5	90.5	200 "	10
80.5	92.5	225 "	12

Changing Valling about 3/100 higher each rate.

air	Cell	40 amp	def
71.5	68	0	=3.5
71.5	72.5	25	1
74.5	76.5	50	2
76	80	75	4
73	82	100	9
74	84	125	10
75	86	150	11
77	88	175	11
77	91	200	14
76.	93.5	225	17.5

air	Cell	50 amp	def
70.5	68	0	=2.5
71.5	73.5	25	+2
73	78	50	5
73	82	75	9
73.5	85.5	100	12
74	87.7	125	13.7
74	91	150	17
74	93	175	19
73	95.8	200	22.8
73.5	97.2	225	23.7

12	17.5	23.7	as the 225 amp
10	14.	22.8	200 "
9	11	17	150 "

Same cell discharge 30 amp rate
it was chgd 8 hours at 30 amp.
stood overnight to cool to normal -

Air Temp	Cell Temp		Dif
72.5	71	0	= 1.5
71.5	74.5	25 amp	+ 3
73	78	50	5
73.5	83	75	9.5
75	86.5	100	11.5
76.5	90	125	13.5

End

Above cell only gave 124 to V.
Should have curves dischg at higher rate,

E18 1350 cc. 21% KOH, 61 grms!
2.0 H, saturate the solution -

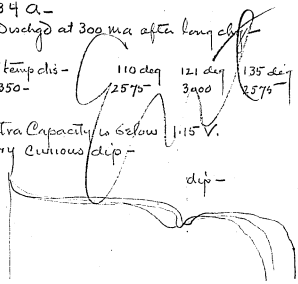
Fe 534 a –

Discharged at 300 ma after being charged –

Normal temp dis –	110 deg	121 deg	135 deg
1350 –	25% –	3400	25%

The extra Capacity is below 1.15 V.
a very curious dip –

dip –



A cell No 597 –

Short chg –

If charged normal & discharg 135° Fahr
gives higher Cap + 3/10 V higher Voltage
than if chgd normally & discharg normal

If charged 135° Fahr + dis chgd normal
the capacity is only 65% of the chgd
normal + the Voltage is less
than 1.18 average against 1.27

Long charge

The Voltages in this case are about
the same –
But the cell chgd hot lost 5%
less Capacity + then chgd is normal & chgd
+ dis hot.
The long charge acts
Entirely dif from short chg
Why

When get North get a
good Record of these long
charges + tales –

Chg 200
Lo 150

Lithium Tubes

		2hrs	3H	4	5	6	7
21% KOH 2 gms LiOH	5992	391	561	691	797	870	937
	5993	391	562	693	798	873	937
	5994	396	575	711	822	917	960
17% KOH 2 gms LiOH	5995	370	540	677	778	862	910
	5996	373	542	683	785	867	908
	5997	372	541	687	786	872	938
13% KOH 2 gms LiOH	5998	358	495	650	746	830	872
	5999	355	485	645	736	825	878
	6000	340	475	622	715	797	857
21% NaOH 2 gms LiOH	6001	393	575	738	841	942	976
	6002	386	563	720	821	920	972
	6003	392	570	735	841	937	980
17% NaOH 2 LiOH	6004	375	555	708	817	910	952
	6005	386	573	742	861	960	1005
	6006	390	574	750	865	970	1015
13% NaOH 2 LiOH	6007	381	567	730	840	935	970
	6008	381	566	731	842	940	982
	6009	382	568	741	857	950	985

Lithia =

Ores sold by E Schaaf-Regelman
17 State St
Battery Park
NY

Spodumen $30.00 ton

SiO_2	63.40
Al_2O_3	28.22
CaO	1.54
Na_2O	2.12
Li_2O	4 @ 6%

Lepidolite $35.00 ton

SiO_2	48.61
Al_2O_3	22.36
CaO	.64
Na_2O	.38
Li_2O	4 @ 6%
K_2O	16.16
MnO	2.05

Amblygonite $45 ton

P_2O_5	46 @ 48%
Al_2O_3	32 @ 34%
Fluorine	4 @ 10
Na_2O	0.4 to 1.5
Li_2O	6 @ 8%

Tested feeding green 1/2 wash not fed and alone in machine without rod moving and without flake feeding
Caught green in dish —
25 Dumps —

1st	25 —	869
2nd	"	873
3rd	"	865
4th	"	880
	4	3487
		872

With the new revolving shafts & arms in the flake Hopper & running it alone got. for 25 dumps

1st	272
2nd	282
3rd	311
4th	298
4	1163
	291

14% variation.

average green 871
" flake 291
1162
75%
5810
8134
8715

75% green 25% f

But no shaking

Will the shaking give more green or flake? —

Another Experiment

Took a tube & bottom cup made 25 dumps of flake alone using plunger to get

9 ozs 295 mlg of flake + 797 grain
whereas without plunger 291 " 872 "

This is a strange result 6 z more when jarred whereas it less - possibly some grain was lost thru holes but probably no flake -

Length of grain 3/8 inch
" flake 7/64th wide

This would show flake took up same room as grain for same weight which is a strange as its 2½ times heavier -

Filled 25 dumps both flake + grain
Weighed 1.050 -
should give 1092 -

Gut

Experiments to determine Concentration of Alkali on chg & discharge of Tubes.

Tube No.				
		KOH, 21%		
6131	Tube fully chgd	quickly	rinsed water	KOH, 0.357
6130	as discharged	"		0.512
				0.155
6136	NaOH, 15%	Charged	"	0.267
6135	"	discharged		0.409
				0.142

Gut

Yellowish sediment on hard rubber in cells is a very basic iron persulphate.

Mr Groth says the iron oxalate as mfd often contains quite a remenant of some basic iron sulphate & while the oxalate is transformed into iron oxide at comparative low temp which would seperate the iron from H_2SO_3 Thinks that there is a residue of SO_4 in final oxide this might explain yellow coating -

		Volts	Amp	watts
5992	21% KOH	72	79.7	57.4
5993	2 LiOH	72.8	79.8	58.1
5994		72.9	82.2	60
5995	17% KOH	72.2	77.8	56.1
5996	2 LiOH	72.2	78.5	56.6
5997		72.2	78.6	56.7
5998	13% KOH	71.1	74.6	53
5999	2 LiOH	71.1	73.6	52.3
6000		71.2	71.5	50.9
6001	21% KOH	69	84.1	58
6002	2 LiOH	68.2	82.1	56
6003		68.6	84.1	57.6
6004	17% KOH	70.5	81.7	57.6
6005	2 LiOH	70	86.1	60.3
6006		70.3	86.5	60.8
6007	13% KOH	71	84	59.6
6008	2 LiOH	71	84.2	59.8
6009		71	85.7	60.8

Reg tubes — Bismuth 210ft group —

Charging Cold 7622 group run hot Capacity
good Volt good — 1280 mah +

Chg hot run cold Capacity low —
500 — but Cap To Volt good

Chg hot run hot, fair Cap good To V

Reg Cold 1280 —

This shows discharg hot is
ok but chg ~~hot~~ is
very bad — for Bismuth
r

Some Bismuth are ~~good~~ fair
when chgd hot discharge hot
1200 off a 1350 tube

Experiments with CP Nickel strips and Regular irons with + without LiOH — KOH, Cl(g) + Reversed —

6457 21% 2 gms LiOH each cell.
6458 " 3 "
6459 " Saturated "
6460 " 1 gm "
6461 33% KOH alone
6462 21 " alone —

24 hours charged — all Ni strips slightly tinted

24 " Reversed

6457 —	0.0069	from
8	0.0078	"
9	0.0135	
6460	0.0092	
6461	0.0200	
6462	0.0080	

2nd charge — 33% has quite a deposit of X all others had deposits but not so much. 1 gm LiOH is next to 33%. 58 + 59 quite small. 21% very only little. as 6459 is equivalent in ions to 33% nearly it seems above LiOH helps diminish X deposit —

2nd Reverse

6457 — Very bright — no gas only O — grease on as H_2O film cleaners
6458 " "
6459 Pretty dark deposit grey shows small crystals
6460 — Very slight brownish deposit not all over cleaners in 2 seconds in HCl
6461 — Black Heavy deposit
6462 " " not so much as 61

Note, Brightness may be due to Hg —

64.59
6461 } Is attacked very slowly by dilute HCl.
6462 Kept at near boiling heat,

as 6462 cleans up in the acid it resembles in appearance exactly No 6459 when 1st taken out, so all the deposits (1st) 59 61 + 62 are the same. It certainly looks as if these deposits were partially amalgamated this would account for the brightness of the strips and in case of 61 + 62 that deposit was not sufficiently supplied with Hg to make them bright — another thing is slow action in HCl which may be explained by Hg. It looks as if KOH, favors amalgam of Ni surfaces in Alkali + thus gives loose deposits of deleterious material + removes old deposits 6459 after ½ hour nearly boiling is now bright test by rubbing slightly with finger its silver like showing that its amalgamated — hence KOH. conduces to amalgamation + holds the mercury in the iron — and also evidently removes some scum that is not removed by KOH alone — otherwise Ni strip wouldnt amalgamate.

after 1 hour in acid No 6461 + 2 still had dull grey deposit — had to polish off with Rag which got black from 61 which has more deposit on it this

grey than 62 although it looked brighter – scarcely a sign of amalgamation see no Hg under Micro –

So far the results would indicate –

1st LiOH. Keeps Hg on the iron + prevents its migration on reverse –
hence iron doesnt go into solution on discharge + permit deposit of oxide inside + one tube, possibly Hg holds Co + other metals back on the iron –

2nd Should cell get reversed very little iron goes over ~~because~~ + considerable Hg which seems to follow the iron –
Any scum or film of X stuff coming on Ni is loosened up by the tendency of the LiOH to form it + cause amalgamation – Without LiOH, considerable iron migrates + scarcely any Mercury – Which is the Reverse with LiOH –

The improvement in old cells is due to film loosening – + should be great on Reverse of the Nickel Electrode –

1 gram per short cask in 21 KOH in not quite
Enough to stop deposit of iron but
probably would be in 15 to 17% KOH,
2 & 3 grams are ok but saturated
8 grams with 21% is too many ions - equals
31% hence if saturated so to be used
then about 10 to 12% KOH is best, 12% giving
Equivalent to 24% ions —

Nickel plating should be thick as with
LiOH it amalgamates. Easy on
any free iron surface it would also
amalgamate & might make short ckt
or local action on tube —

Even Ferrous Na Sulphate irons should
have 12% H_2O if one use LiOH
instead of 5% H_2O — then
iron should be carefully
amalgamated, have high
economy & be held from
migrating in Reservoir —

Cobb

3rd Rev. strip Cathode —

The deposit of iron on strip grows heavier each time — There is unfortunately more deposited on strips in LiOH solns as it rapidly darkens in air — But there is still little, on all, therefore there is not doubt LiOH takes some iron off Ni & permits Hg to amalgamate, I think is no good as yet, probably only two weeks enough LiOH to cause amalgamation & prevent deposit of Iron in Process on charging Reg tube as anode there is some metal, probably that comes over & deposits & this is reduced when it becomes cathode & amalgam takes place —

Think Ni is a safe KOH containing LiOH —

2nd Reverse 40 hours Ni strip Cathode

6457	0078	H_2O_3
58	0037	"
59	0070	"
60	0080	"
now 61	0360	"
62	0105	"

Nickel strip anode about 50 hours

57 pink Red. very light
58 " " spots
59 " " spots
60 " very light
61 "
62 Blood Red. deep like red lacquer —

all these C colors come off unfortunately on clipping in 10% Con. H_2O_2 = Water cup and dilute pinkish — Dry/soft ole [illegible] Nun but [illegible] the test ng

3rd chg — Ni strip Cathode —
57-8-9 — Go bright — Hg pinkish, 61 & 62 dark coming
61 Black — all but 61 & 62 clean up bright after air oxidation
clean mechanically — 61 & 62 dirt clean in 5 minutes —
all the iron spots pimples — when Ni strips 1st taken out H_2O — [illegible] off — greasy — purple in Ether Alc or organic Rubber compounds —

Appearances of a lot of Cells -

72

100 mlgr Flow Sulph

5775 - Tube grey Tube Yellow brown (light) no crystals

5776 - " Lighter Cells - two crystals

~~[illegible]~~ tint of yellow on small part in inf Bar -

5777 Tube same as 5775

Tube grid yellow - Crystals on metal parts.

250 mlgr of Sulphur

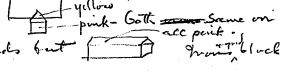
5778 - Crystals shiny - all over all parts Tube is grey in bottom part + disappears with 1/16" of top where it is yellow - Ms rings look just as if now turn elapsed on rubber - The top 1/2" of tube is yellow - light shade - Rubber yellow on cut surfaces from grid grey

5779 - Crystals all over - tubes dark brownish yellow all over - Tube grid black - from grid block

5780 - Crystals all over No yellow on Rubber Tube bright just detect shade off color of pure Mg - probably due to yellow grid clean [from grey grid and grey grid tube]

5781 ~~Do~~ Everything coated
Crystals - tube darkish - tube grid darkish
but tint light - Rubber very yellow
all over - from black grid black

5782 Crystals all over -
tube bright but tinted up to 1/2" of
top where the gradually brights.
Tube grid tinted yellow to orange
Worn tube -
Bottom Rubber is coated pinkish
Color - middle side rubbers -
yellows in Cut Edges.



5783 = Crystals all over
tube really bright - grid darkish
tint - rings bright -
Rubber ~~on~~ each Except bottom
for 1/16 up all around hooks are
if placed with Copper
but rub off - from Black -

Geo Mulg J. Lapham

5784 Tube deep brown – grid ditto –
Red sediment on rubber – slight yellow
Brown grid & pkt. grey Nuts amalgamated.

5785 Tube brownish yellow not so deep
as 5784 – but grid is jet black –
Graphite & grid grey – nuts & everything
amalgamated in minutes – yellow on
Cut surface of Rubber – Red sediment
on one rubber – tube rings same tint
as tube –

5786 Tube and rings – deeper tint than
5785 – & grid yellowish & deeper than
tube – nuts & grid grey – parts amalgamated
Red deposit. No yellow on Rubber
Deposited Fe on the grid dust rub off –

5787 Tube & rings yellow
Tube grid deeper yellow —
Rubber yellow on cut black on top
Fat grid uniformly gray

5788 Everything same as 87 except
rubber all black — no trace yellow

5789 Tube rings much deeper yellow than —
88. Tube grid very deep yellow.
marked dif but the same shade —
Rubber black no sign yellow
Iron bright + apparently annealed

5790 ~~Both~~ crystals on all parts —
~~Tube~~ bright grid yellow brown ~~tint~~
Iron grid + plat black. Rubber black.

5791 - Same as 90 - but bottom rubber
has the copper like deposit —
No yellow on cut surface or brief exposure
deposit on ~~[illegible]~~ fat grid & plat black —

5792 Dense Coating Crystals on tube, - dark brown tube and black except 1/2 inch of bottom where it is light violet tint. Rubber yellow on Cut surfaces

5793 Tubes light yellow and about same - Rubber coated grey color. Possibly Hg globules - Micro shows they are Hg coating & thick & carefully covered by conducting Fe grey amalgamated

5794 Tubes very bright no tint look like new - Fe grey amalgamated Rubber perfectly coated with Hg globules Many cracks & carefully welded short cut. Yellow on Cut Edges of Rubber.

5795 – Tube pearly deep yellow
Rump ditto – grid deeper tint –
Tz pkt grey – ~~[illegible]~~ amalgamated –
Hg globules in my cracks &c –
yellow on Cut of Rubber –

5796 Tube etc like 95 – Iron pkt
rough apparently no amalgamation
of the grid – its darkish – pkt grey
Hg globules Coat rubber – no yellow
on Rubber –

5797 Tube & rump lighter than
96 – grid yellow tint very light
Tz pkt grey grid deeper color
Rubber Hg Globules No yellow
on Rub Cut.

5798 about same as 97 some yellow on Rub out.

5799 Crystals all over - rather deep yellow on tube & rings - grid much deeper yellow - Front grid grey bottom same grey Nothing - no yellow.

5800 - Tube perfectly bright, grid slight tint - Fresnel top - for grid darkish - no remedy No rubber on

5801 Tube very slight yellow tint, only 1/2" at top same with grid - 97 dark no remedy - No rubber

5775 to 5801 —
put in Water - all
Crystals disappear

Equivalent Ions

9% LiOH. 15% NaOH. 21% KOH

36.4 RbOH. 56.25 CsOH.

Weight of new tube plate complete.

483 grms 1 lb 1 oz

It is however extra heavy standard

With 3½ lb coat new 8 tube condenser anti bounce compound —

No 1	10.932
2	
3	10.476
4	10.861
5	10.937
6	10.554
7	10.808
8	11.006
averages	10.694

Original Extension
Extension taken in cold
652 m.c.g
94.5% or 5½%

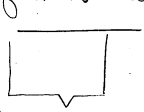
Time to free 16½ mm at 47 Rev per min

One Cubic inch of Cast Ni. of Coke
which has been oxidized & red by H.
& Reg. .0001 - weighs 1 oz
3.157 —

with the 6" Reduction Tube weight
of Section 6 dia 1" long 75 grm
or 6" to lb - with 42 inch hot
gases for 1 hour reducing time 7 lbs
or 70 lbs daily - per tube - 10 hours -

Results using 1/2 check U.S. 00005
oxdzd transparent yellow - Reduced by
Hydrogen 4 mil of flake 24 x 10 z
9/08 Big Drum glass —

4 mil is enough flake + covers cobalt
surface — conforms to irregularities of
Edges turn up against tube or of
Chunk - the green showing under 3 1/2
lb not in cause of turn up —
It would be safe to use less than
4 mil to 24 green although there
are lots of 2 or 3 thickness of
flake.



Sections show hole through ie show
green in center spot no flake —
sometimes sections break out thus

Core of tubes all broke up - apparently soft in the center & hard at Edge
This pkg is quite different from all others

Flake & grain both scattered by falling on wires — Seems as if more ~~[illegible]~~ flake went to edge & made better contact with tube —

Regeneration of old Cells -

	5th Inoculation	6th Inoculation		
2491 A	727	730		
92 A	620	763		
93 A	730	730		
		Bottle gone		
5359	713	710		
60	647	650		
61	700	700		

R.A. Experiments Absorption of Iron Mix of Cracker —

3 grms dissolved 100 Cent. lost 3/10ths of 1%

Same sample allowed to stand in air saturated with moisture absorbed as follows —

15 mins	absorbed	6 milligrammes
30 "	"	8 "
45 "		9 "
75 "		11
105 "		14
135 "		14
225 "		14
315 "		17

Total absorbed in 5 hours 15 mins 17 mlg 56%

EWA

	Dust	1st A	2	3	
5653 A	850	817	820		No improvement
5837 A	723	927	1013	1033	1030 – on hot lect
Kept soaked out then H_2O little KOH few drops then put in 100 mily KOH cooked all night, poured off & washed out in H_2O alkaline – then in 2% K all night – [illegible]					
5365 A	653	703	727	727	
Boiled out in very weak KOH 3 [illegible] hot [illegible]					
2491 A	790	653	600	600	
2492 A	793	713	620	613	
2493 A.	777	700	607	600	
5359	577	727	680	673	
5360	525	683	643	653	
5361	560	667	657	663	
Been hot making					
2433 A	927	990	1017	1010	
5819 A	378	373	337		
5820 A	333	327	297		
5864 A	623	933	947		
5913 A	873	900	887		

	footings	
2491B	.790	610
92B	.793	660
93B	.777	627
5359 B	547	750
60 B	525	760
61 B	560	760
5653B	850	600
5365B	653	600
7527 B	493	587

Notice that green that has Bismuth in that LiOH cells on 1st 5 runs Cold are higher than plain 21% K

Cells with $SrCl_2$ $BiCl_2$ + or radical are with LiOH much lower than plain 21% K on 1st 5 calorimeters

Iron is not affected by Changing Heat, like the Nickel –

Plain Ni in 21% alone dont give 1/3 of its Capacity on Chg hot 130 fold – with 21 K + 2 Lioff, it gives about 1/2 Cap + with 21 K 2 Lioff + Bismuth in green, gives about 3/4 or sometimes full Capacity

Notebook, N-07-05-04

This notebook was used by Edison in May 1907. It contains notes regarding experiments with an aluminum electrolytic rectifier, a device used to transform alternating into direct current and used in recharging exhausted storage batteries. Inserted into the book are several loose pages of notes relating to the rectifier work. The pages are unnumbered. Only 3 pages have been used.

May 4 1907

Aluminium Rectifier experiments

Test following solutions in Rectifier
make them when possible 15% strong
or less according to solubility.
Test efficiency - Capacity - Heat,
amperes for inch Etc -

Aluminates of Na K + Li NH4
Phosphates of Na K Li NH4
Borates Na K Li NH4
Chromate Na K Li NH4 Mg Sr
Calcium Potassium Chromate,
Cerious Bichromate, Cupric Bichromate
Ferric Bichromate, Magnesium Potassium Chromate
Manganous Potassium Chromate Bichromate Potassium
Potassium Sodium Chromate, Sodium Bichromate
Strontium Bichromate,
Ferrocyanide of Potassium Ferrocyanide
Sodium - do - Lithium - do NH4
Ferricyanides of Na K Li NH4 -
Ca Sr Ba

Permanganates
K Li Na Sb Ba Pb Cd Ca Ce
Fe Co Cu Mg Ni Hg Sr Ur
W Zn Sn
ditto Carbonates, that are soluble -
ditto Perchlorates of the above metals
ditto Chlorates "
ditto Tetramolybdates
ditto Nitrates
ditto Trichloroacetates
ditto Peroxphates,
" Phosphotungstates
" Sulphocyanides
" Sulphates
" Sulphites
" Metatungstates.
" Vanadates -
Fluorides of K Na Li Sn.
Cyanide K Na Li.
Molybdates K Na Li
Cuprocyanide of Potassium,
Arsenates K Na Li NH_4
Arsenites K Na Li NH_4
Phosphites K Na Li NH_4
K Alum - Sulphate Aluminum -
Ammonia Alum -
Hyposulphite K Na Li NH_4 Cs Ba

See Conays Dictionary of Solubilities

Try all the well known & most easily soluable salts first,

Test maximum usefulness each sol with permit of a healing effect,

[ITEM FOUND IN BOOK]

1 Try Nickel strip ~~immersed~~ in Carbon with Bicarb Soda & acid phos

2 Try Vanadate Soda — also Vanadate Potassa

3 Carbonate Ammonia & ~~Ammonia~~ Salt with Copper

4 Salts, Salt with Nickel

5 Try 3 of best Solutions together & [illegible] KHCO3 NaHPO4

6 Have John Ott assemble in battery jar under [illegible] No E 18, 18 plates 9 of carbon & 9 of Nickel — If you find the nickel works & test heat of the cell over several hours carbon 40 amps in parallel

[ITEM FOUND IN BOOK]

HCl
HBr
HI
HNO_3
H_2CrO_4
H_2SO_4
Iron
Mercury & Mercurous
Oxide
Sulphur
Other
Arsenious
Arsenic
Antimony
Bismuth
Oxygen sulphone
Sulphuric Nitric Metaphosphoric
H_2S
Hydrosulphuric
Sulphurous
Ferrocyanhydric
Ferri
Sulphurous
Hypophosphorous
Silicic
Selenic
Benzoic
Amido benzene sulphonic
Phthalic
Saccharinic

Chromic
Bichromic
Molybdic
Tungstomolybdic
Stannic
Phosphomolybdic
Vanadic
Silicotungstic
Aluminates
Aluminoferrates
Oxyphosphates
Thiocarbonates
Telluric acid
Zirconic
Ferrates
Silicates
Manganates + Permanganates
Chlorates + Perchlorates
Iodic
Periodic
Molybdates
Tantalates
Cyanides
Ferrocyanides
Ferricyanides
Cobalticyanides
Boric
Borotetramolic

Metaphosphoric
Phosphorus pentoxide
Fluoboric
Carbonic
Thiocarbonic
Nitroprussides
Periodates
Methiocyanic
Nitrites
Picric
Thiosulphates
Selenite
Iodine
Sulphobenzoic
Hyposulphites

[ITEM FOUND IN BOOK]

See if any Aluminum Salt will coat a nickel strip with a film & then transfer to Na Bi Carb using two nickel strips one of which has its film from the Aluminum Salt

Try in Cu Sulphate Solution Nickel a 1/4 inch wide & 12" Centimeter & alternate thru to see if it will unbalance the waves sufficient to work the Gurnsey phone

In Reg Al Rudolf - Na Bi Carb
See if can get thru on 3 grams di Oth
Change the current etc.

[ITEM FOUND IN BOOK]

Try Lead Electrode, with surface spongy. ~~and~~ Same as plante forming process. Need only a 1/1000 of an inch of it.

Try ~~Bi~~ Cerb Na + also phos

Try one of our iron pockets, Changed —

~~[illegible]~~

Try Silver Electrode with finely coating peroxide Ag formed by Electrolysis —

Test this principle of having the surface of deformed metal finely divided ~~[illegible]~~

Notebook, N-07-05-13

This notebook was used by Edison and laboratory chemist Otto Groethe in May 1907. It contains instructions by Edison to Groethe regarding various chemical experiments pertaining to storage batteries. Alongside the entries by Edison are Groethe's notations concerning the test results. Inserted into the book is one page of notes by Groethe and Walter E. Holland. The front cover is labeled "Chemical Laboratory Book." The pages are unnumbered. Approximately 20 pages have been used.

Contains available alumina

May 13 1907

Dr Grothe to determine SiO_2 Fe Hg & Al_2O_3 etc in old Nickel Tube —

must have wt. of tube

Dr G. Determine viscosity 21% KOH containing 2 grms Lithia OX in 100 cc solution | ditto 15% NaOH with 2 grms Li_2O or LiOH, det. to T. A. E. 5/15/07.

det. 14.5 cc

Dr G Test ½ oz VO_2 green $(NH_4)_2$ (get from Waller Archer) for SiO & Carbonic acid,

must so gr. contain SiO_2 - also a large amt. CO_2

Dr Grothe Boil one oz VO_2 green $K(OH)_2$ with 5% NaOH + solution saturated with LiOH, wash free of alkali & dry qual. to Calum in bottle,

make sure free of KOH & wash free of alkali

Dr Grothe to make some Thallous hydroxide & determine its solubility in water — in 21% KOH & in 15% NaOH,

prepare sol. in 21% KOH & 15% NaOH as ready

45% = 504.2 = 15
25 20
504
25 60 — 12 gr
32 20

39 24 = 7.1
39 65
560

Tungstic oxide [illegible]

6406 } 15 gr. WO_3 — 525 c.c. 13% Na_2SO_4
6408 } = 18 gr. WO_4

6409 } 6 gr. WO_3 — 525 c.c. 13% Na_2SO_4
6411 } = 7.2 gr. WO_4

6412 } 6 gr. WO_3 — 525 c.c. 21% Na_2SO_4
6414 } 7.2 gr. WO_4

[illegible]

Make 4 or 5 oz of CP Tungstic acid
want it very pure for filaments I understand
they have to get it 99.75 pure or
absolutely free from iron or [illegible]
want it finely divided for reduction
in hydrogen I have to press it
together in a lump by hydraulic
pressure and must have it
impalpable powder otherwise it
will not stick together by pressure

[illegible] WO_3 [illegible] WO_4

No P_2O_5 — much Fe_2O_3 & Al_2O_3 much Lime (determined)

Soft Phosphate Mark XXX
Natural state — Phosphoric acid anh. 20.44 %
equiv. Bone Phosphate of Lime 44.72 % or
the dry basis 46.96 %; no Potash, much
Silica, Alumina & insoluble, calcium carbonate
moisture 8.00 %.

Sla. Mark — Blackman — dried at 105° C.
No 1 — 2.19 % Ammonia, no Potash, trace
Phosphoric acid, 54.11 % mineral matter, sandy, much
No 2 — 3.37 % Ammonia, trace Potash, trace
Phosphoric acid, 28.38 % mineral matter, sandy, much
No 3 — .75 % Ammonia, trace Potash, trace
Phosphoric acid, 81.90 % mineral matter, mostly sand
—

Lower Sulphur 1.98 % Ammonia, trace Potash,
trace Phosphoric acid, 51.74 % mineral matter, slow
white clay and sand mostly, the better

Analyze the Humus from
Mr Hardman for Humic acid
Phosphorus Lime & Potassium
? Nitrogen ?

Ditto the Humus from Mr Sulphur

Analyze sample marked XXX
from Mr Hanson Ft Meyers —
Soft Phosphate — 20.44 P_2O_5 — 44.72 $Ca_3(PO_4)_2$
no K_2O much Al_2O_3 & Fe_2O_3, $CaCO_3$ much Sand for P_2O_5 omitted.
What is the sample of Blue
stuff sent by Mr Harris —
It is Oyster = Gyanite
U.S.

The hypochlorite of Soda commences to act only after about 36 hours digestion in the heat. Sol'n acts very much slower. Bromine (exclusively Chlorine) works in the cold stands out Sulphur at once.
The alcoholic Hypochlorite of Soda solution by mere digesting with the hard rubber assumes a pale red colour while the saturated c. P. solution of hypochlorite of soda after about the hard rubber in about 36 hours in the heat. Pieces of rubber floating in the liquid. This must be therefore a destruction of the rubber is not greater in hypochlorite in the heat.
Bisulphide of carbon extracts a brownish material from the rubber and the Carbon assumes red tinge. Peroxide of hydrogen acts slowly, HCl + KClO3 does not act at all, H_2O_2 is the best solvent so is the H_2O_2 + HCl in the heat.
Bromine mixture acts taking out a very large quantities of Sulphur but is surprising attacks the rubber — Chlorine notwithstanding same may and if Sulphur is to be taken out from the hard rubber, then the extraction mixture of the same with Chlorine or Bromine mixture taking fresh liq as soon as the first

Cut a lot of Reg 1/8 inch rubber in 1/4 inch squares — use 100 - and treat with Hypochlorite of Na of definite strength for 24 hours at 150 Fahr + determine the Sulphate

after 36 hours only a trace of H_2SO_4

Another lot of 100 Jrs at with same kind of Hypo 24 hours at 200 or 212 —

a strong trace of H_2SO_4 after 36 hours

also another lot treat at 150 48 hours + determine sulphate,

Take another lot soak in Carbon Bisulphide 48 hours — then 24 hours at 150 in Hypo + determine Sulphate —

SS + solution brown

Another lot treat with Hypo to which is added 33% KOH, 150 Fahr 24 hours —

solution almost wine red

Brown or Chlorine has been used up seems to be the best plan but it attacks the rubber envelope.

Mother with MnO_2 + Water by volume it contains .125 gr. H_2SO_4 (as sulphuric)

Take one oz of No 2 green from Walter Archer & determine the sulphate in it

Contains — 100 gr. — .0711 gr. H_2SO_4 = .109 gr. $NiSO_4$ (W. Wlen)

Take 1 oz of our Regular Iron Mix and determine the sulphate in it, I think there is Iron sulphide in our Iron —

After you have found out best way to remove the sulphur from the rubber have John ~~all~~ cut

Some 1/4 inch pieces from all the different kinds of Rubber he has been using in test cells —
Rubber varies much in amount of free Sulphur —

Ammonia determination in 6 cells: det. 8/31 07.

Water analysis for Silver Lake commut 8/31 07.

See whether an determination of NH_3 can be made

It does not precipitate

It does not precipitate

It does not precipitate

It does not precipitate

See if Magnesium Hydroxide freshly precipitated will precipitate Alumina out of hot KOH.

See if Ammonia will throw down Alumina from KOH, when added in Excess,

See if Monotungstate of Soda precipitates Alumina from KOH, Completely as Books say

See if Formiate of Potash precipitates Alumina from KOH as books say

Li, etc

[illegible]

If $LiOH_2$ is pure and Li_2SO_4 or Li_2CO_3 are formed pour $BaCO_3$ can be made this way.

Precipitate iron sulphide in a little water & $Li\,OH$

The $Ni(OH)_2$ is transformed into the L ($LiOH$) and this is more affected by $Li\,OH$.

Books say Li_2CO_3 — decomposes
Salts of NH_4 Ca Mg Al, Fe Cu + Ag

The least soluble Lithia salts are
Phosphate Li = Phos of Na + Li —
Fluoride Li + Silica —

Try sulphate Lithia + $BaOH$ see how free of Al_2O_3 + $BaOH$, can get it

See if precipitated iron sulphide precipitated from KOH solution is dissolved in traces or changed by $LiOH$.

Put a little precipitated $Ni(OH)_2$ in KOH, pass a little H_2S see if blackens or changes the $Ni(OH)_2$ if so add $LiOH$ & see if dissolved or changed

Ni.

Proof $Ni(OH)_2$ is absolutely insoluble in $LiOH$ even on prolonged boiling.

See if chips of Hard Rubber are affected as to Sulphur or otherwise by Terpineol — books say it is
I have some in store room —

See if freshly precipitated $Ni(OH)_2$ is perceptibly soluble in $LiOH$, or $LiOH$ in KOH 21% saturated with $LiOH$.

6 Iron determination. det.

100 c.c. of 21% KOH reduced 1.5 c.c. Permanganate
for same amount + .0008 O. shaking with the
same with addition of H_2O. As known air was distilled
under vacuum. K Mn of this solution may be fairly due to
the H_2O.

Test on KOH & NaOH.

With permanganate K to
see how much reducing
agent there is in it —

C.P. KOH. gives no reduction
with permanganate on heating
out contact with air —

11 oxydation of the SO4 + Mg. by Alum
just finished to be run from Mon.

Old pickled recovery

N: I Assumed by $MnSO_4$, Cr_2O_3 + cy. $Cr_2O_7K_2$

N: II do

N: III

Two particles change their CaH_2O_4 + $CaKO_4$ to Na all O.

No 6 changed Alum test by Na all O and is now more acidic.

No 7 $(NH_4 - NH_4)_2SO_4$ + $BaSO_4$ = Na all O - placing O in $FeSO_4$

[ITEM FOUND IN BOOK]

5/14 07.

W. Archer

Please send me 6 boxes about 3 or 4 in.
Nickel hydrate W: 2 x oblige

H. Smike

Mr. Hooper or Holland

Please send me 6 boxes assort. old Nickel
tubes with the usual mix. – Take that have been
sent for long time in envelope 21 1/2 K 0 4 and
a similar regular mixture. I oblige

H. Smike

I have got some very old
tubes but don't know whether
they are nickel or cobalt
mix. Better get Mr. Edison
to give you numbers of ones I have
W. S. A.

[ITEM FOUND IN BOOK]

[ON BACK OF PRECEDING PAGE]

Let me have some of these tracts which
their asp. minister Rd. is now in to my
U. Grant

Notebook, N-07-05-22.1

This notebook covers the periods May 1907 and October 1910. All entries are by Edison. The book contains notes and drawings regarding attempts to amplify phonograph recordings using an electromotograph. Included are tests of numerous compounds in the motograph cylinder, with some notations of the resulting sound quality. There are also entries relative to the wear on phonograph cylinders after repeated use. The front cover is labeled "Emg." The pages are unnumbered. Approximately 40 pages have been used.

May 22 1907

21% full strength seems to give loudest results, Wally + Bell phone alone as transmitter –

Saturated LiOH solution louder than 21% KOH or 15% NaOH, but our hair brush attacked by the alkali + this gets on track + spoils it – tried making a linen brush which is very little attacked by alkali –

I notice that after washing $SrCO_3$ cylinder several times + then stop it is loud for a while but gradually dies down but if the edges are wet + not the track it immediately gives full volume – The sides of the wand is platinized – Evidently the action either of the telephone current or more probably the polarization current + this insulates it up –

Am using Mica diaphram – palladium pressure foot –

May 23 1907

Have now limin brush to wet chalks with Linen cloth folded up + ends frayed out –

Tried holding the other pole on the Chalk so current could go thru base + also thru the pen held by hand on the moving surface. Couldnt find the slightest difference in values of sound –

Noticed when chalk got little dry high piccolo squeak Guy wetting the Edge of chalk next mandrill + not the track it instantly ceased This is a current effect + is a Phisnomenon –

By holding the palladium pen on Chalk + not using base at all sometimes it louder + sometimes not –

with a $BaCO_3$ Chalk wet with LiOH, then as it got little dry used Na_2CO_3 to wet, dilute dose well as of used LiOH, but not much difference —

Putting in Aluminum Rectifier one way weakens the other way with anode Res strengthens it double but in great resistance dont seem to make any difference —
The Rectifier has 10 inches surface think it would be better for this experiment there was not more than 1/2 or 1/4 inch surface —
It probably acts to prevent the Chalk generally a back current,

Platinum + Palladium pens seems to G2 about same volume –

With mixture of 21% with some LiOH, I hear it with tubes very plain with very little sensitivity, thru 12 600 ohms. Although in –

Silicon pen not quite so loud, it beat on bad spot in – possibly the chalk is getting worse or it would have been as good as Platinum – it is not perfect a uniform Except in one half of it + this might not have engaged the chalk –

Silver pen – little weaker than Silicon but probably due to cylinder going bad –

Aluminum not a sound on short. Current even –

Antimony little weaker than Silicon probably ~~as good as~~ that if had good chalk hear it on 12600 –

Bismuth — ½ as loud on short current as platinum makes a black track —

Magnesium — not a sound on short current — blackens the track most rapid yet — few turns does it —

Arsenic — This dont blacken the track seems to be good & worthy of going with platinum seems to scratch very little — Alkaline — find get better results when wires are on way on check than the other —

Nickel — good but should say not so loud as platinum —

Cobalt — better than Nickel 25%

Gold not loud - cant hear on 12600 ohm - may be check galling bad -

Cadmium - ~~Nothing~~ old check - cant hear thing - New check - faint on short circuit -

Chromium - just hear on short ckt -

Thallium Nothing -

Carbon Very faint on short circuit!

Amalite, loud on sht ckt can hear on 12600 ohm but not so loud as galena I think

Magnetite Not a sound -

Berryllium - No sound

Iron — Very poor on 1" short ckt -

Tin — Very faint on short ckt.

Iridium ball — Al of Rect to pen not very loud on short ckt & 1/2 as loud on 12000 ohm showing that balls are good for very lts & high Res no scratch on pulling - Al of Rect to brass (12) Reversing Dynamo in Eng no sound on short ckt.

Have very delicate receivers and Gernade with very perfect hand balls light pressure - for London on heavy Current the surface should increase in proportion

to the Comment -

Osmium Iridium Ball - Nothing
poss by nat pt Ir -

Platinum Iridium Ball -
about same as Iridium Ball.
same phenom as to hardness on
alt chk + 12000 ohm Cent not
so good -

What is wanted is an
Iridium point pen for strong
Colorists & larger Iridium
ball for 10 & 12 ohms
No perceptible wear after
back is made

New Al Rectfr 1' I surface Al facing the Round Carbon —
Platinum pen, 21% KOH, near plain 12600 ohm Very loud on short ckt. Al to pen. Carbon to line & other End line to Gouge - Best —

Pt pen - new check wet 15% K_2CO_3 about as good on 12600 but not so loud 1/2 on short ckt -

Test with dif Solutions -

Plat pen $SrCO_3$ check -

Bell Telph Al Rect. short ckt &
12600 ohm

Aluminate Soda Saturated
1/2 loud as KOH, near plainly on 12600
Check little Rough -
adding little KOH doesn't improve it
soaks up solution very slow —

50 cc H_2O 20 cc Silicate Sol of strength of 10% —
too weak — Showed big strong Silicate in 21% —

Strontium Aquarium Sat
Sol — can hear on 12600
~~not~~ scarcely any stronger
on short ch — not loud
even when KOH used —

K Bromide 1/4 loud of KOH.
Notice that when Al to base
it can be heard thru 12600 +
not when Al to pos —
also notice when Al to pos
+ Al Rod shortened little louder
on short ch but squeaky at times.
Thus KBr acts little chf — than
those previous — Tried KOH,
Made up 1/2 loud as KOH alone

K Chloride alone 1/2 loudness after nearly saturated then KOH, think it nearly as loud as KOH alone, very clear & plain on 12600 +
Notice this Carbon gave Extraordinarily smooth Crack Cant hear a scratch or sound of any kind even when Reversed probably many times extra good crack — Notice it gave pulsed tracks cathode width, few which is unlike most others possibly this is accidental because of no scratch —

K Nitrate not so good as K Chloride

21% saturated with PbO —
3/4 loud Reg but came
louder when put KOH
on track — showing its
inferior to KOH.

Barium Hydrate Sat Sol —
1/2 loud but when KOH put on
its loud think it as loud as
have heard with Bell —
Notice by pulling great
pressure on & getting wide
track & then letting up
on pressure loud increases

K phos then KOH plenty — Very loud
as loud as I have heard
Stands great pressure. 9 mm
probably KOH alone is as good
not very sensitive to 120 cg —

Chl Barium followed by KOH.
alone BaCl 1/4 lound — with
KOH about 1 Reg or less —
Can hear in 1260d — not
other smooth —

Hyposulphite Soda 1/2 to 1/3rd
lound of KOH add
KOH, 3/4 lound of KOH alone
~~then add~~

Chl Zinc 1/4 lound KOH, 3/4 lounds
loses soon —

Sulphate Cu Mg - KOH, poor —
KS nothing

Bell Recer for Transmitter

Bismuth Cylinder & Aluminum pen
Bell Recer or Transmitter no sound

Bismuth Cylinder Copper pen —
Bell Trans. — no sound.

Bismuth = Iron pen —
Bell Trans. — no sound

Bismuth Platinum pen —
Bell Trans No sound.

Bismuth Zinc pen
Bell Trans — no sound

Bismuth — Arsenic pen
Bell Trans — no sound

Bismuth — Aluminum pen —
Bell Transmitter — No sound
West with Pi Card No "

Bismuth – Thallium pen –
Bell trans – no sound – moistened Bi
with KOH, thunk heard faint sound
on light pressure –

Aluminium Cylinder Nickel pen
Bell trans no sound – K_2CO_3 BiC – no sound
KOH, no sound –

Magnesium Cylinder Nickel pen –
Bell trans. – thunk heard it
KOH, thunk heard it no sure –

Reg chalk KOH (often I pressed
Rebently pressing Hgl. against surface
& wet cloth KOH, (I spoke sound
Mg –

Induction Coil (Telephone) 1 Cell £ 18 –
Key = given hard knock 12000 ohms –

For testing if there is any knock between sketches –

Lead Cylinder Platinum pen
Nothing

Lead Cyl Cu pen
Nothing

Lead Cyl Brass pen
Nothing

Lead Cyl – Plat Iridium ball –
Nothing

Zinc Cylinder – Plat-Irid ball –
Nothing

Oxalate Tin — KOH dissol go in
No Sound — gt pen —

Zinc Hydrate — about 3/4 or less
of Req $SrCO_3$ —

Oxalate Magnesium. Cannot
hear on Short cut
Scales off with pressure Mg

Manganese Hydrate, Scratchy
Cracks — Cannot hear a Sound
on Short cut —

Experiments with $SrCO_3$

Moist before pressing —

1 cc H_2O to 20 grms $SrCO_3$
Much louder than dry $SrCO_3$

$1\frac{1}{2}$ cc Louder than 1 cc.
12600 ohms 1/3rd loudness of
dry moistened on short ckt

2 cc Not as loud as $1\frac{1}{2}$ but
probably not mixed as well
as

$2\frac{1}{2}$ cc is as loud as $1\frac{1}{2}$ cc
This is the limit as any
further water makes it
squeeze out in press —
about 2 cc is Best probably

Phenomenon
Smooth scarcely any sound by Fred pt
E heavy no scratch whatever —

Left a good $SnCl_2$ after boiling 3 days. when cool with H_2O only weak. dilute KOH scrapped off on forge no better again weak KOH, 1/3rd Loudness of original —

Electro Silicon - plat pen — KOH 1%
3/4 loud of best - very smooth
no scratch - louder with moderate quantity KOH,
try LiOH + NaOH do this is Silicon - Can probably use acids. — Have Dr C. test see what it is —
Track platinum —

Iron Oxalate Plat pen —
KOH 2% no - pops or flakes off

Zinc Oxalate – Pt pan —
Water wet — Ng

KOH wet dilute – Ng

KOH. 21% Ng
Rough – Very great friction
1/4 load one way turning a coarse
any other way — Thus all BB
has big friction when 21% KOH —

Antimony Oxalate – Pt pan —
21% KOH —
All cracks up on cutting

Reg Fe Mix from Silver/Cobb Pt pan
1/4 as load – Very severely + friction
4 grs orks load – takes enormous
amount KOH —

Phenomenon

$Ni(OH)_2$ 1/2 week Pt pen —
Not a Sound — Keeps
Green — good track — strange —
Wet 21% ROH.

Magnesium Hydrate Pt Pen —
3/4 of Reg Loud — Very very smooth
Something in this hear on 12600

Lead Oxalate — Pt Point ROH 21%
decomposes scarcely hear
Round flakes —

French Chalk — Pt point 21% ROH
Not a Sound Not smooth

Kaolin – Pt pint – 21% KOH
Not a sound

Nickel Oxalate Pt pint KOH 21%
No sound scales rolled off

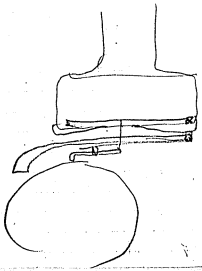
Lead Hydrate Pt pint 21%
Extremely hard
Scarcely heat it – Ng
Dont take KOH to scale
only little –

Aluminum Powder pt pint
Ng – attacked by KOH,

Tried fuller Earth cylinder
but the moment the KOH put
on it softened & broke — Nil

Get Telephone with 2 poles
close together —

This is my phone arm thus



This is good — got it adjustable
to & from Dip —
On short ckt the 1/2 as loud as
Record direct thru funnel of
not 5/8 thru = ~~HD~~ by using
a pt at pen twice as wide as
Rec got it louder than with
Rec width =.
~~BU~~ When Rec is in the clear
but when short ckt there is
lot of squeezy sounds &
unwanted clattering, either
that there is a limit to Ch. MK
or the dia is too flimsy
to 4. 4 + 4 built up
Urea — changed to 5/1000
about the water —
Must have a stiffer dia
to stand the hot by pressure
~~with~~ I used an double
width dia — when 12000
ohms in the family-cord
in tube, ~~opened ckt +~~
put finger across Blade,
with 12000 ohms in
bazaar — the just about as
loud thru finger + 12000

as when switch closed -
Evidently it counts a
slight dia or trigger -
Put in 10/1000 steel not
enough - Shows such a
powerful friction that
the elastic power of dia
is unable to pull shell
back against the friction
but holding thumb &
pressing it back it closes
the heavy sound shows
necessity of powerful
spring forward -

11/32 dia pretty good 1/2 Reg
Lond - 20/1000 steel balls 62 deg
10/1000 Rhodium rings OK +
steel =

Found that Mg hydrox
is very smooth, + possibly
fric + ~~[illegible]~~ 1/2 pts lond
to Sr Carb - Think
mixture of 75 $SrCO_3$ + $MgOH_2$
will be fine -

Only 2 brushfuls KOH 21
on New $SrCO_3$ Chalk is best
~~in~~ = its so hard with 10/000
steel, dia + rubber rings
Can't hold tube in clear
Have to use 1500 ohms
to stand it =
Comes out in funnel
nearly as hard as
direct from Record —

Oct 1 1910

Started Experiments again with Holograph =

Cooper $SrCO_3$ Cylinder 21 Kolt, Bell Rivers — don't seem to be any where near as loud as older Experiments but I have grown much deafer which may be the reason

I now am going to try washing Cylinders with different Solutions —

1½ Microfarads in no acceptance
No Resistance in 1st test + then to determine Sensitiveness and was till close sounds

Washed chalk key in water after washing

1 = Citrate Soda, 1/4 Loud of 21 K added funnally a little KOH, no better —

2 = Ferrocyat 1/4 loud, added KOH no better

3 = Cyanate K - 1/2 loud of 21 K added 21 K no better —

4 - Tungstate K -
Can hear 6000 ohm with KOH, little better think its louder than KOH, alone, Should try stunts on Tungsten Compounds,

5 Phosphate Soda 1/4 -
its high res as can hear at 4600 ohm - added KOH. hear at 6000 ohm

6 = Cons L. Oth –

This is better than 21 KOH.
& confirms previous statement
that it was the best near it
quite well thru 12500 ohm
& louder than 21K on
short ckt –

Note, I do not hear in one
tube in ear hard expansion
performed but by pressing
ear at one place can hear
nearly as loud as in
the other ear in tube –

added little KOH say 1/2 & 1/2
little better, too loud on
short ckt –

It is evident that Res of
Chalk too high & as
I intend to work on
short ckt must
widen the pen

to get resistence.

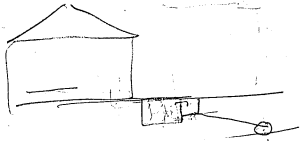
Wider pen is still better —

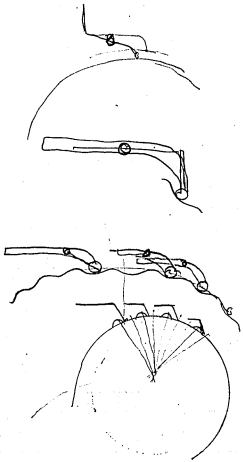
Must have split wide pen
& bal joint & stiff arm —
a very wide pen —

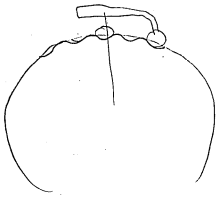
Wide platina (Double width)

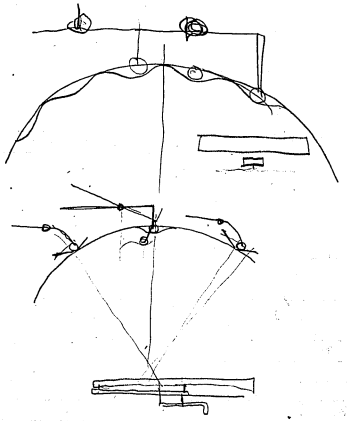
Mix of LiOH KOH NaOH —
squeeks if detached OK —
hgar thru 12500 Cam head
several ft away in funnel

Pulling Mercury out
on surface goes 1/4
loudness









Wear of Mouldm Records 4 min

Some amberola apks run 75 times
on No 70 Record 47 words —
wear record very little, no destruction
of walls — Records sounds ok to
the last, no side wipes or jumping
of apks — This on Idelia

When this a good apesker is put
on amberola rigged up to take
the Idela apks & Cygnet horn
one record at 25 was fair
2nd record all worn out many
side wipes & jumping over
threads at 25 — This shows
there is motions giving the
amberola mandrel that
is not in the Idela —

The shifting of the mandrel
is very bad — The limiting
washer is to out of true
vibrates cylinder thickness
which is also bad —

15 | 7500 (5
450
750
15

This is the character of the jump that destroys the records —

450 Vibration Sec = 2 vibration $\frac{1}{225}$th part of a second —

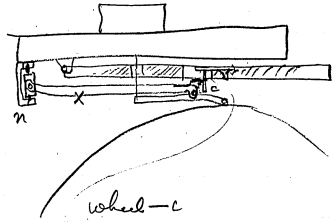
This would show, that the lot or mandril is too slow & that it is the small lever that gets to the limit & the wire to diagram jerks it back. But the movement of lot or Mandril is the cause of little lever reaching to limit

Oct 15 1905

So far Experiments show that Naturally the lateral movements of weight + lever, they do not compensate but the fixed screw controls the ball lever with rotating fulcrum is a positive defect instead of an advantage as heretofore supposed — owing to short leverage of the ball section the swing of this section places button across the grooves + wears out record.

Any lateral movement of the button should be on the longest lever possible —
The weight should have no endwise movement, as jarring of Machine puts little legs to one side + wears record
~~the~~
The ball point + lever can never be moved by the record until it can

move sideways extremely Easy
the heavy weight has too much
motion to permit it. The only
way I think is possible is
thus

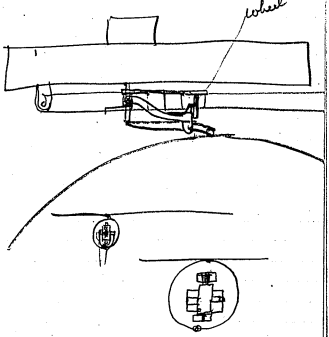


X is long lever with universal
joint at n, has wheel C
which connects weight
to tall lever thing X.
the wheel is 250/1000 dia.
with a 10/1000 per Bearing
any sideways motion deals
with and recovery X is
very Easy Gearing 25 To 1.

Fig 1.

the only defect is that the button lever does not move arcwise concentric with the center of the arm

arm making another one turn

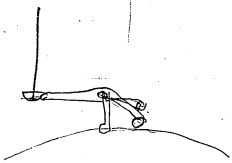


We are now spending
15 Shellac
5 Sabra
1 3cc Dichlorohydrin —
the latter dissolves the
brittleness of Compound
so it dont bite off on
going up hill —

We make five second
1/32 thick + peel in Ends
its rather fragile + we
are putting in
flocked Asbestos
which well

make it tough
the main trick in race
Cashedon is to get it
exceedingly fine & not
Clothed Together —

One record has gone
on long part 500 line
& scarcely shows was
Uncle Bill wheel
bullow Cambe ward
& then gradually unpacking
quality of horses



List pers

Osmium-Iridium	Point	Sulfide Iron
Iridium		Smaltite
Platinum		Magnetite
Palladium		Chromium
Zinc		Cadmium
Lead		Silver
Antimony		Copper
Bismuth		
Tin		
Aluminum		
Magnesium		
Silicon		
Thallium		
Arsenic		
Cobalt		
Nickel		
Gold		
Iron		
Beryllium		
Carbon flat		
Plate-Iridium	point	

12 | 18 (1.5
12
60

50
300
60
0
12 | 41 (17
12
82
0
84

5 50

15 300

50

40) 430 (10.7

40

300

3

4c

11c 10%

7.5 13.5

6.0

81.0

81.00

Notebook, N-07-11-25

This notebook covers the period November 1907-July 1908. It contains notes and drawings by Edison and an unidentified experimenter regarding cement experiments. At the beginning of the book there are cost estimates and production notes pertaining to cement house construction. Included are items relating to settling of aggregate material in poured concrete, waterproofing and painting concrete, storage bags for the cement, and using concrete joints in continuous-process belt equipment. Also included is a 3-page note regarding the use of colloidal films as coatings on phonograph cylinders. Inserted into the book is a letter from July 1911 regarding a shipment of zinc ore drawn from land adjacent to the Edison Portland Cement Co. quarry. The front cover is labeled "Bags Cement House Belt Expmts Viscose." The pages are unnumbered. Approximately 30 pages have been used.

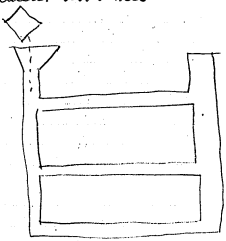
Nov 25 1907

Form foundation 6 men 1 day	1.60	9.60
Erecting forms 3 derrickmen 2 day	2.00	12.00
1 Engineer 2 days	3.00	6.00
6 Top men 2 days	1.60	19.20
6 Bottom men 2 days	1.60	19.20
4 General men 2 day	1.60	12.80
6 Elevator Erectors, Spouts etc 2 days	1.60	19.20
44 men 1 day pour		70.40
370 yards excavation 20c		75.00
Screen + Crush + dry -		12 80
5 Tons Coal		20.00
Engineer 2 days -		6 00
Carting		60.00
Taking down forms		88 40
Filling up earth		12 80
Dressing up house 2 men 3 days -		15 00
Painting Pneumatic		15 00
		471 80

Cement 177 bbls 1.35	238.00
Steel rods	160 00
Clay	30 00
Piping	60 00
2 Heaters + 9 radiators	215 00
2 Water Closets	20 00
Windows - Doors	80 00
Surfacing floors	12 00
Painting tiles	20 00
	835 00
Labor etc	471 80
	1306.80
Interest + depcn Moulds + Machinery	93.00 -
Dettomacturing	64.00 -
	$1463.80

Experiment with this

Nov 25 1907



With 1 Cement 3 Sand thru 20 mesh
5 1/4 crushed rock sandstone O.K –

1/2 Trap - dont flow well + in water
sand is not screened thru 20 mesh

1/4" Trap with 20% clay added
to Cement O.K —

1/2 Trap 20% clay added to
Cement O.K — } all without
tamping S S —

(1)

X

Iron

3726 ft straight sides or 7452 both sides
one inch thick 1 cu ft = 1" — 621 Cu ft
285600 lbs

6400 ½" for floors partitions roof 12800 ft
Total 533 Cubic ft

245 180 lbs
Total 530,780 lbs

Casting machine work 5¢

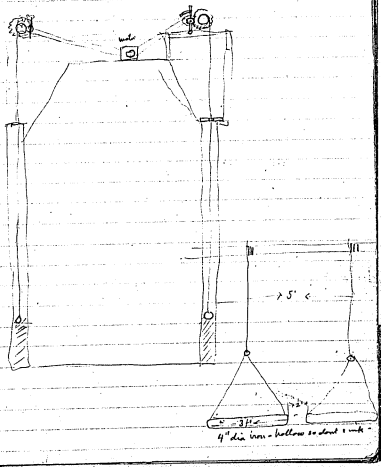
$26,539.20

125HP Boiler	1200
Engine	1500
Truck	800
Dynamo	1500
8 motors	3500
3 Hoists	2500
3 mixers	2500
Dryer	1000
Screen	500
Crusher	350
Elevator	1075
Trucks for mixers	900
Haul Trucks	1800
Misc Tools	800
	$14,925

$19,925

$46,464

Pumping



Elevator,

8X6 Load 4" deep

192 Cubic inches per bucket,

100 buckets per minute

= 11 Cubic ft

660 " per hour

24.4 Cubic yards per hour

Requiring 8.2 Hours —

Should have Speed about 150 buckets per min for margin —

Power —

Elevator friction, motor friction, 5 HP

Elevation 1500 lbs Cement

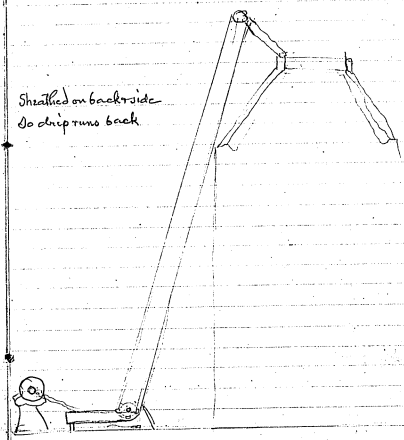
per min 36 ft high. 2 HP

7 HP

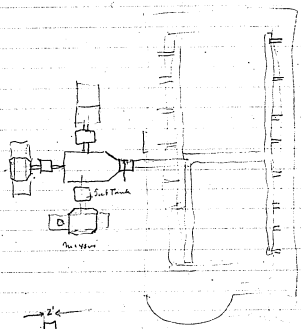
Requiring 10 HP motor —

X

Shrathed on backside
So drip runs back

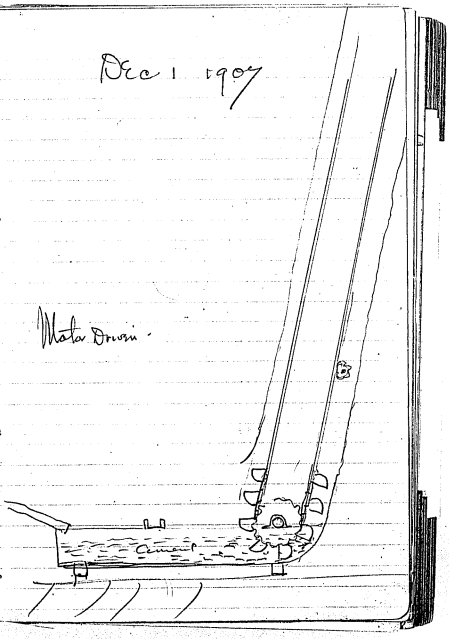


Dec 1 – 1907



Dec 1 1907

Mata Drum.



Dec 6th 1909

Following have been tried ~~with~~ to increase viscosity of water to be used with Concrete to prevent drop out of aggregates in long tortuous pouring spaces.

Rosin Soap Excess rosin - good.
Iceland Moss - fair
Slaked Lime - good.
~~Kaol~~ Clay -
Hydrd Alumina

Rosin soap 10% & 5% is entirely too viscous
Cement & Sand made to mush in a pat shrinks horrible & crack on setting - NG —

Alumina Hydrate sets in white but spongy NG -

Slaked Lime sets fairly hard don't crack & appears OK
10% —
Notice that when immersed in H_2O sponge heavy got very hot -

Dec 16 1907

S.O.G. Hydrated Precip —
Lateral Check Mg —
Cracks must be thinned
down —

BS from Standard Oil dis.
in Jelrone & Carb or
Turpentine painted over
Barons Centralo makes it
perfectly weather proof —
Cerasin paraffin etc Mg
BS is the best of all the
wonderful —

X

Jany 20 1905

So far BS in Either Benzol Benzin or Turp OK - The residual naph Col used for phono records if it can be —

Cement walls painted with this is absolutely waterproof —

To prevent it being sticky when used on houses Mix Linseed oil with it just enough to prevent sticky

This ought to be a valuable paint for Cement work —

Have tried all the colors. Sent by Heller & Merz The Oil Colors are good some fade others do not Can mix Ultramarine & solid pigments & get tint also

X

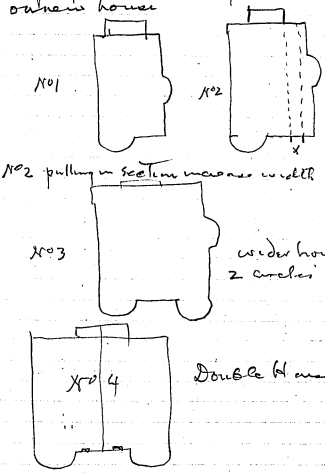
Another paint which is not water proof is mixing very finely ground Neat Cement with pigment Fe_2O_3. Ultramarine Blue in water & after quick drying Cement surface by black of Carborundum or Emery paint it again — it sets & holds the pigment in place.

After setting it could be painted with BS paint or where the color of BS is objectionable the more expensive Oleate Lime paint could be used but I am afraid time will effect the compound Oleate which would do with BS —

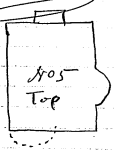
X

Jan 20 1908

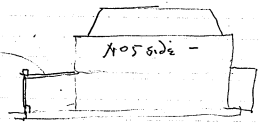
I propose making variations on new house



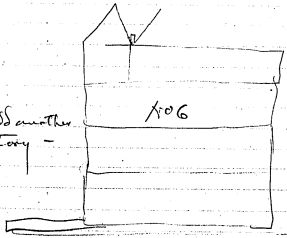
May 20 1908



Cutoff circle

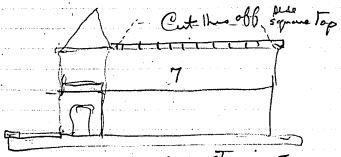


awning



add another story -

Jany 20 1908



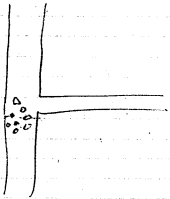
only 2 stories -

also square top & 3 stories -

also square top 2 stories
with & without Circle
using Veranda Cover 2 over

Jany 22 1908

New Scheme to Cheapen the Concrete in the new poured house —



When pouring the everything Concrete 1 Cement 3 Sand & 5 of 1/4 inch Have slat of 1/2 to 1 inch stuff top of Hands & when the Concrete is moving vertically during the slat of the Coarse in that Wahem There is a horizontal flow stop during — as the large pieces would settle & block the flow also when it flows across & up = It may be that instead

×

of 1 3 + 5 of 1/4 inch
the 1/4 inch could be reduced
to 1 3 + 2 of 1/4 + dump
3 of 1/2 to 1 inch on top -
or thus make a 1 3 + 5
mixture -

Of course this could be made
with the mixers just as well
if it could be regulated so
more of concrete with large
stuff would flow into the
horizontal channels -
by doing it on top it could
be stopped easily

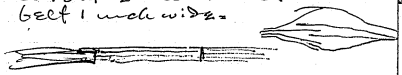
X

February 4 1908

The Sections of the house
Could be moulded say 2 1/2"
thick accurately & Erected
1 Story at time - held together
by bolts & Concrete poured
in between just as if they
were non moulds, the Reinforcing
rods to top being held up by
a slight frame work
thin Steel Shapes.

X

6 ply belt each alternate layer
Cut out. 2 inches back
belt 1 inch wide.



No 1 — Very thick viscous dough like
spread with knife — scatter nail out.
Put on hot plate watch big growing
for 30 min cooled
Brake 351 lb

1 ply brake others peeled out

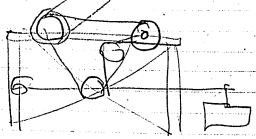
No 2 Dup of No 1 Except
put on hot plate 15 minutes

Brake 521 lb
Brake square off —

Breaking test of belt
with cement joints

weight of leaver without bot	56 lbs
25 lbs on end of leaver	122 "
50 " " " " "	187½ "
75 " " " " "	251½ "
100 " " " " "	317 "
weight of box only	23 "

Thus as with the machine



No 3 Viscose on thick put on hot plates with 1/8 inch cloth between the hot plates — under pressure — 15 minutes —

Brake 459 lbs —

No 4 Dup No 3 except on 30 minutes
Brake 597 lbs —
Brake square off —

No 5 Viscose on thick put on hot plates with 1/4 inch cloth between for 15 minutes under pressure
Brake 469 lbs
Brake off square except 1 ply pulled across

No 6 Dup No 5 Except
on hot plate 30 minutes
in autoclave —
Break 523 lbs —
Pulled out without breaking
any ply all separated

No 4 Dupes put in thick then
put on 1/4" asbestos for 10 min on
hot plate - under pressure —
for 15 minutes,
Break 533 lbs —
Oil soaked dry enough —
Pulled out except one
ply which broke —

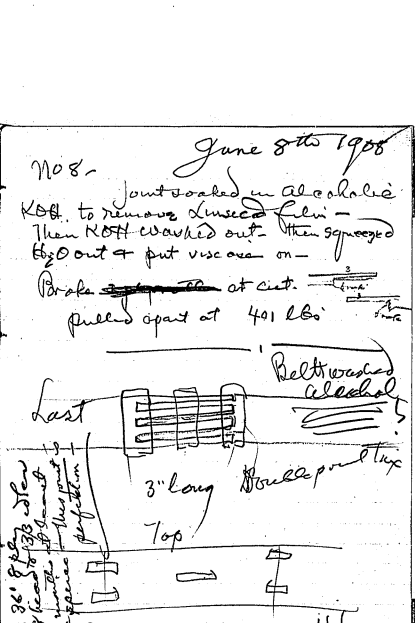
June 8th 1908

No 8 -

Joint soaked in alcoholic KOH. to remove Linseed Oil -
Then KOH washed out - then squeezed H_2O out & put vise over on -

Broke ~~[illegible]~~ at cut.

pulled apart at 401 lbs



another one but extra pizza
put on such a side run 9 hours
+ then splice ok -

2 [illegible] tons - 5 ft × 4 2½ deep

8000 tons

40000 300 | 80000

Bags -

10 gms. Sulfite paper

10% NaOH.
5% "
2% "

Vescose Cement joint
made on army duck bags

Lap 1/4" Clamped between 1/4" asbestos
on hot plate one hour to dry Vescose
well rubed into canvas and about 1/32"
thick

3/8" Lap

1/2" Lap

5/8" Lap

3/4" Laps

7/8" Laps

1" Lafs

July 21 1908

So far the dipping of a record in Nitrocellulose – Amyl Alc + acetone is quite successful the loudness when the film is stable where record has deep indents is about 25% lower than the record direct. Where the indentations are weak its 40% lower – There is great difficulty in keeping the film free of specks – These floating in the air are kept free of the film by enclosing and a tin box rotating the record in the box + blowing air thru Cotton onto the record to dry it – also by rotating in Vacuum + Evap to amyl alcohol way –

The films stick to the record very tight as the amyl-acetate has a slight solvent action on removing a film the whole surface of the record becomes detached with

the Collodion film + the record looks dull + wants bite - depth - the reproducing from the stripped record is bad + doubtful for some reason

Am dipping collapsable mould in the Sol to get a polished cylinder of it 003 thick - This is placed in a mould + the albumen put in liquid + spun at high speed to cause the film to remain the instant - if they are not full depth will have to add Camphor so film will soften more - Camphor

put in moulded blank with smooth film dipped on it & mould hydraulic against form which is a plaster

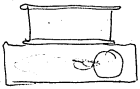
Also smooth paper cylinder on which film is dipped + then forced into matrix by hydraulic

The opening back of the paper being to remove it from mould

July 21 1908

To get great amplitude without second tool jumping out of record I am going to dip a reg record BC Ink in a solution which on evap will leave a very friable film 1/2 (you think) I can track thru this to the hard record below without taking the film in Consideration as to chipping out hence of gold plated by Vac without regd. can get much louder records —

Try paraffin in a solvent not attacking blank — also Earthy compos —



180
120
3.00

6.00 / 30

40"

12000

30.
3

50
30
15
12

12000

187
2.67
4.0

3600 / 26000

180
3.00

180
12.00
19.3
386 / 5347 / 1,1,68
1,2,65

180
108

10.68
50
50

[ITEM FOUND IN BOOK]

FORM 47A

TRADE MARK
Thomas A. Edison

The Edison Portland Cement Co.

THOMAS A. EDISON, CHAIRMAN OF BOARD
W. H. MALONY, PRESIDENT
J. LINTON THOMPSON, VICE-PRESIDENT
H. F. MILLER, TREASURER
WM. H. HOHNE, SECY & ASST. TREAS.

Telegraph, Freight and Passenger Station, NEW VILLAGE, N. J.

P. O. ADDRESS. STEWARTSVILLE, N. J.

SALES OFFICES:
PHILADELPHIA, PA., Arcade Building
NEW YORK, N. Y., St. James Building
NEWARK, N. J., Union Building
BOSTON, MASS., Post Office Square Bldg
SAVANNAH, GA., National Bank Building

July 20th, 1911.

Mr. Thomas A. Edison,
Edison Laboratory,
Orange, N. J.

Pat
Give to Mrs Edison
Wilson Greene
7/27/11

JUL 21 1911

Dear Sir:

I am sending, today, by Express, box of samples of what appears to be zinc ore. These were picked out of the refuge pile from the shaft that was sunk on the Raub farm next to our quarry.

Yours very truly,

W H Mason

WHM-RR.

I Dick
Pat

Notebook, N-08-00-00.1

This undated notebook was probably used by Edison in 1907 or 1908, but it may have been used as late as 1910. The book contains notes and drawings regarding attempts to increase a cylinder record's volume by adjusting the pressure applied by the reproducer or recording mechanism. There is one entry relating to storage batteries. Also included are several miscellaneous drawings, probably by Edison's youngest son, Theodore. The pages are unnumbered. Only 15 pages have been used.

William H. Hussey
...STATIONER...
Good Work Promptly
68 William Street,
New York.

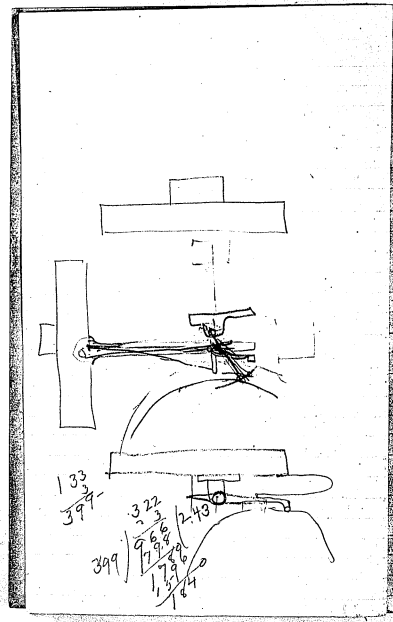
dischg KOH Bi

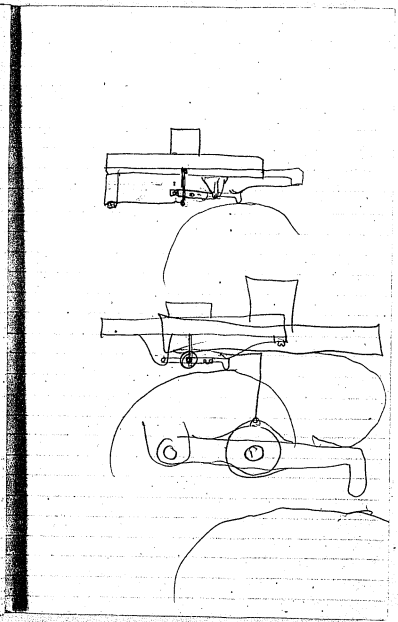
Bile

now chg (cold)

Bi deposited

on die Bi plates in MnO_2 of felt
of in Sol —
Start in sol & lower
current gets and cathode,
current gets and cathode,


1.33
3.99
.322
3
9.66
9.89
7.86
1.57
1.84
2.43
399



6 to 1

175
6
105 3.2

4 times area $\frac{1}{4}$ the movement
means same power same —
~~power~~ power over 100 friction of time
or 700 1 to 1 700
2 to 1 350 to
slip of 3 to 1 233 —
probably 2 to 1 does it —

175
105

133
133
399
399
399
133
1.76
7.1
3 150
1.66

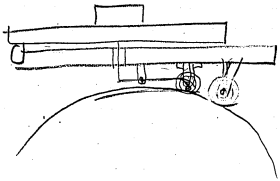
33
33
9
9.9
9.9

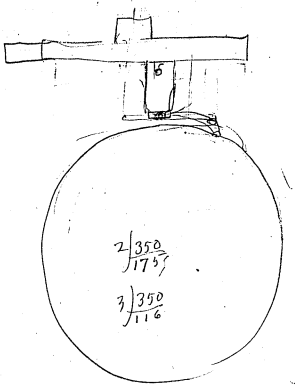
2 to 1 - Dia worm
10/- mount 5 —

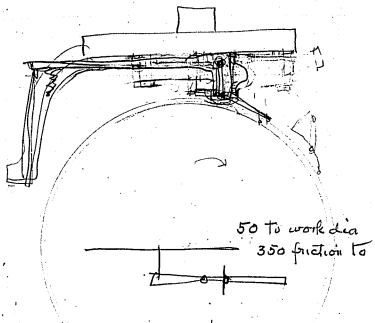
32
9.9
6
9.9
9.9
7

1 to 1 dia 5 mount 5
Req 1 to 2 Dia 2½ " 5
" 1 to 3 dia - 1.66 — 5

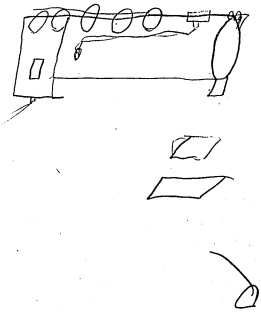
166 | 1000 | 6
996





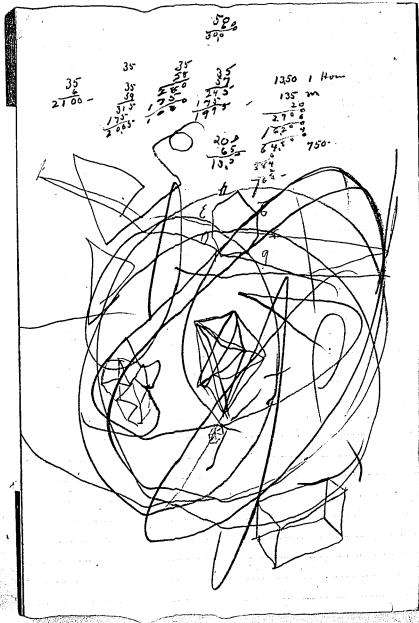


get this grip.
Equal leverage 350 pressure on
wax — 2 to 1 170 — 3 To 1
116 — This bring pressure down to
where wax should be — for loss
3 to 1 make dia 3 times area
+ move 3 times less amplitude



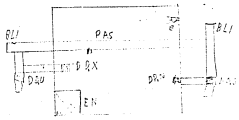
4007
2984

016



375 000	10 —
750	20
1125 —	30
1,500 —	40 —

1. FLOR of underground house.

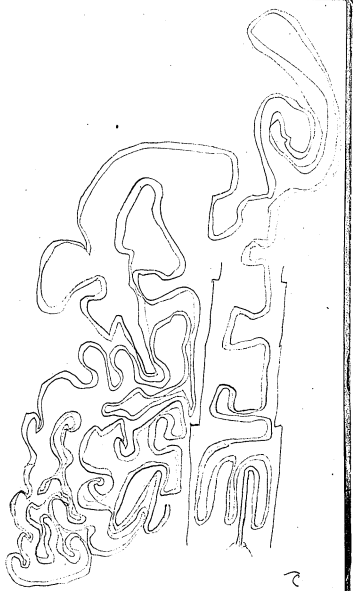


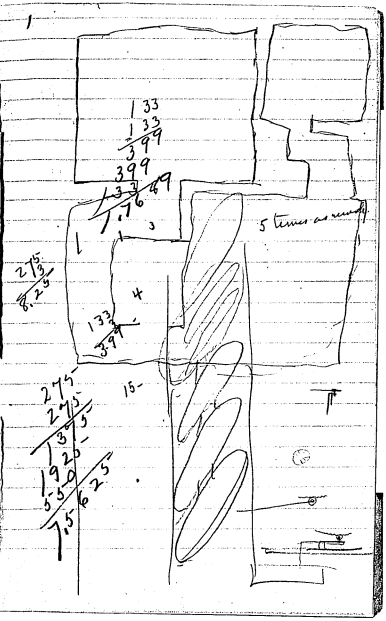
2. flor of underground house

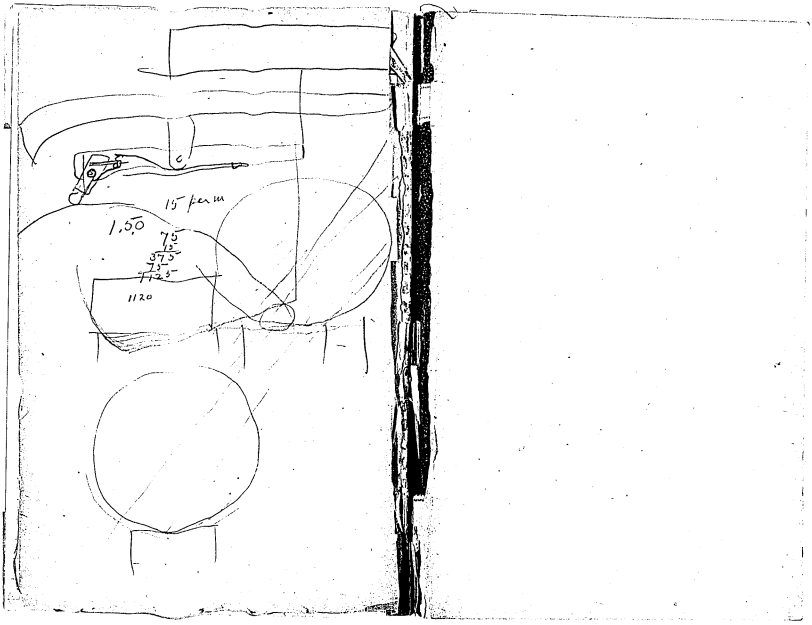
6f

$6 \frac{20}{3}$ centifoot -

$$\begin{array}{r} 45 \\ 45 \\ 40 \\ \hline 130 \\ 30 \\ \hline 390 \\ 3 \\ \hline 1170 \end{array}$$




133
133
399
399
133
1.76
49
5 times around
275
13
8.25
4
133
399
275
275
15
275
275
1320
1980
550
7.5625


15 per m
1.50
75
37.5
112.5
1120

Notebook, N-08-00-00.2

This undated notebook was probably used by Edison in 1907 or 1908, but it may have been used as late as 1910. The book contains notes and drawings regarding experiments with the electromotograph, which Edison was using in conjunction with attempts to amplify the sound of a phonograph and for more general work relating to electrical theory. The pages are unnumbered. Only 4 pages have been used.

Eng

Cylinder formed oxalate lithia mass

Cylinders of neutral oxalates for Eng

Smooth Crystals easily can pass to
pass on attack -

Acetate Hg.

Rubf. HgO pump on pen trough.

Key - also HgCy. + KOH,

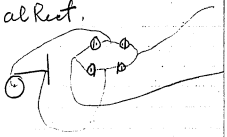
Iron cylinder helix around, Iron pen

Cylinder Solid K Silicate,

globule Hg fit close

William H. Hanes
... STATIONER ...
Good Work Promptly
68 William Street,
New York.

use 4 way al Rect.



Aluminum Cylinders Coated in Bi. Carb K -
Light press pen -

Battle Sea Water see of Al Rectify
work in it if so bare wire Cable
Telegr -

Cylinders of all the metals
highly polished - on each metal
use all the pens - also have helix
around & test with & without
helix around & lengthen wire use switches
also pen with angle Lamina of Mica &
alter the thickness - thin glass
by Dolly - section of Cylinder -

Get most cylinders a Dry
polishing also a clay pencil —

Cylinders, Gypsum - Rangitiki Fluorspar
glass - also from Coromandel - Rock Alum

John ~~[illegible]~~ Bunsen mallet
Eng - Mulos —

Put 2 Ellipses on dist see of one
side as an altered for the other -
also deduction loss volume by
2 in Series & 2 — Multiple -

Oxychloride - boil out Chloride & use
for Eng Cycle it leaves it
porous -
Dry Sulphides precipitate
Ultra Final dark Ox —

Phosphates, Arsenates, Arsenites
Sulphites, Antimonates,
Borates, Fluorides, Aluminates,
Basic Salts of above - Ammonia Soda -
Salts of Bismuth -
See if Emf affected by heat,

Moisten Emf Cylinder with KOH.
Carbonates Metals Lead in Solution
by Inorganic & Citric acc.

Try Acetates, Alcoholic KOH,

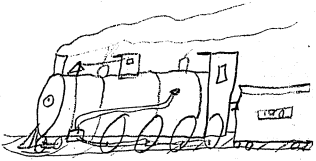
Measure Current V & amp
Coming from a Rotating Chalk Cyl

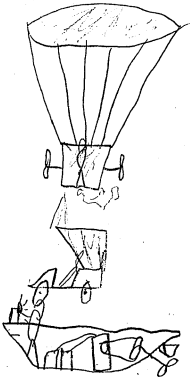
Notebook, N-08-00-00.3

This undated notebook was probably used by Edison in 1907 or 1908, but it may have been used as late as 1910. The book contains notes and drawings regarding continuous-process belting, possibly related to the manufacturing process used by the Edison Portland Cement Co. Over half of the book consists of miscellaneous notes and drawings, probably by Edison's youngest son, Theodore. The pages are unnumbered. Approximately 30 pages have been used.

William H. Hoyt & Co.
...STATIONER...
Good Work Promptly
68 William Street,
New York.

Apparatus.





her	12
fer	11
ster	10
ter	9
ser	7
gler	6
	0
suer	5
mer	4
ther	3
wher	0
ler	1
sher	0

104 401
401 104

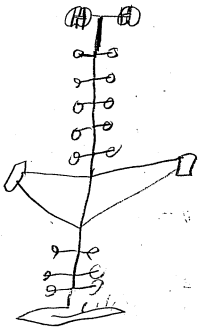
5 3 2
2 3 5
***

+7
216
9
11

9 61 11
7 2 2

4110
-14.
*** 90

72 27



nan

456
654
602

6514
-456
~~1 8 8~~

511
-125
~~386~~

93
12 3

1 1
1 89
17
8 9 1 15
69

19
1 4 2 7
~~58 * *~~

17
8

14
5

13
4
5 1

10
1

4
1 6

2 13 14 11
+1 4 3 2
~~9 * *~~

96
4

18
8
1
9

6014 897
-406 1 897
1 8 1 1 00
7014 897
407
= 16
7
8047
7408
= 16
6
13 12
4 16

50
50 101

204
402
204
198

402 10
204 1376
198 673
402

673 376
-376 763
297 = 16

8 7 4
4 7 8
3.9 6 = 12

12
5 7 1

3 96 12/3

5.3 8
8 5.3
6 8 8 = 14/4

5.3 8
8 5.3
885 = 13/4

8 3.5
5 3 8
2.9 7 = 11/2 = 9/1

6 3 8
3 9 6
2 9 7 = 11/2

6 8 7
7 8 6
6 8 7
7 8 6
9 8 1 = 10/1

6
7.8 6
6 8 7
9 9 = 18/9

402

402
207
197 = 10/1

532
235
297 = 11/2

3

5673
3763
1908 = 190/10

5383
3835
1548 = 10/12

5383
3835
1548 10

14/5

12345679

12345679

10 11 12 13 14 15 16 17

18 19

19345679

105

7
500
4
1
22
900
835
800
100
21

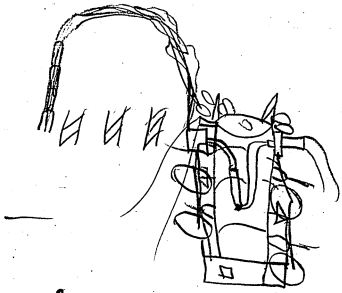
6
50
1000
300
45
15
25

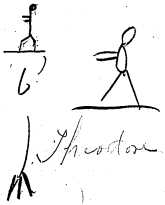
7	6
100	1000
1000	1000
100	1000
1000	
1000	
1000	
100	

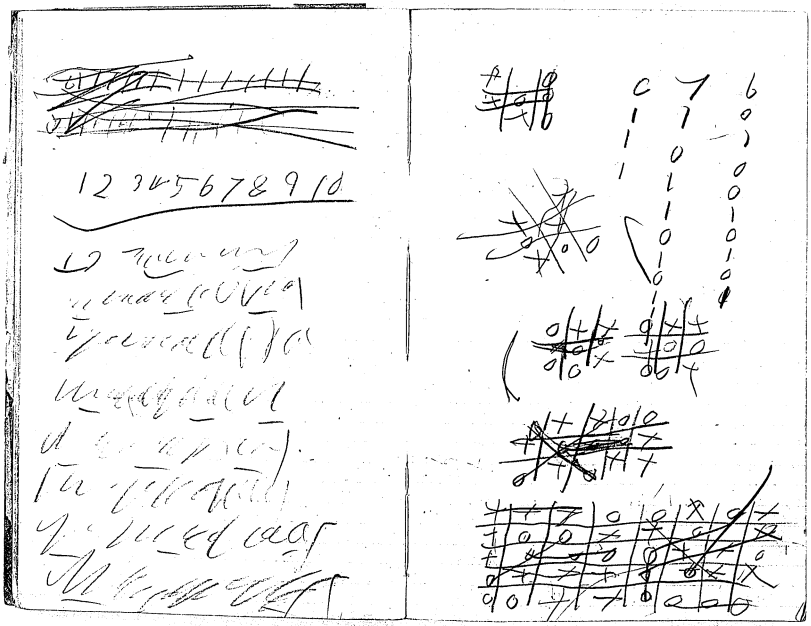
1 2 3 the cat
Caught a flee.
The flee died the
Cat cried 1 2 3.

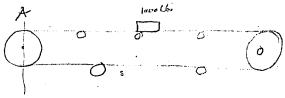
2 3 for yourself

```
  4 5 0
 +7 3 4
 -9 2 4
 +6 2 4
 -5 3 4
 3 5 0
```







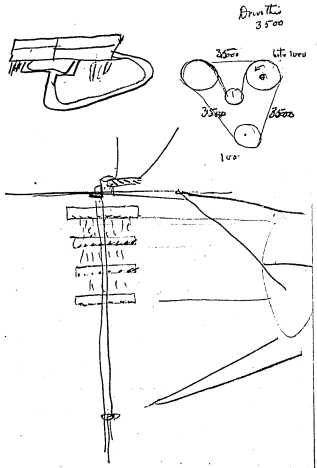


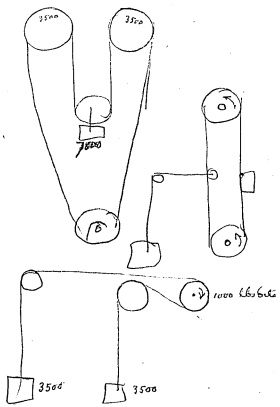
1000 load - friction $\frac{1}{10}$ - 100 lbs when on belt
of bits in [illegible] 1 to 3½ ~~1000 lbs~~

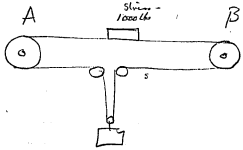
35 | 1000 | 28.5 . 350
35 | 350 | 28.5

A Driven
Slacks on bottom 350 lbs - drills top -
Total when on belt for bits 350 lbs -
Extra pull on top 100 - total 450 lbs
on top 350 bottom -

A + B driven - 100 lbs pull - additional pull necessary
/ for ½ - 175 - additional pull for other pulley
175 -







Bite required A 3500 — B 3500 —

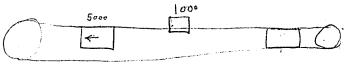
total strain 3500 — for bite — weight 7000

Drive A — stress top 46500 — bottom 3500

Drive A + B — stress wt 1000

stress for bite on A 1750 on B 1750 —

total 3500 on wt —



~~Stress on Belt, 1750 lbs at A.~~
~~& through the belt everywhere~~

If driven at A. It requires a pressure of 1750 lbs stress throughout the whole belt acting thus w/o friction on Pulleys, or bearings at tight

This would produce a pressure on A of 3500 lbs. + give bite enough 3.5 to 1 to drive. This pressure is the same on B but is not utilized — + is a necessary evil

Now if we drive both thru the stress for traction in the whole belt system is reduced from 1750 throughout to 875 lbs

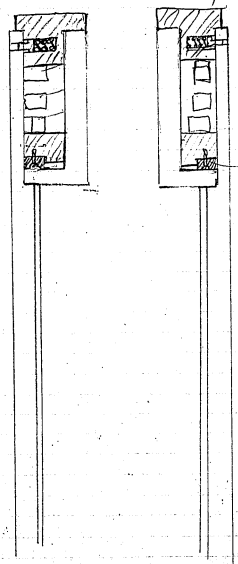
This gives 1750 strain on A + 1750 strain on B - a total of 3500 lbs pressure which reaches to drive

It is the unavoidability of the ~~necessary~~ stress on the tail pulley due to the stress on the head pulley that causes Excess of stress.

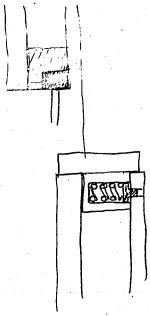
Notebook, N-08-01-21.2

This notebook covers the period January-February 1908. All entries are by Edison. The book contains notes and drawings that deal mainly with phonograph cylinder technology. Included are entries regarding the search for a harder cylinder material and for a light but hard reproducer mechanism. At the beginning of the book are drawings relating to unidentified manufacturing equipment and a one-page entry concerning cement house technology. Inserted into the book are two lists by Edison that appear to be related to phonograph cylinder experiments. The front cover is labeled "Notes [N]ew Moulded Records Rep[ro]d[u]c[e]r balls 1908." The pages are unnumbered. Approximately 30 pages have been used.

Jany 21 1908



Jany 21 1908
7 PM

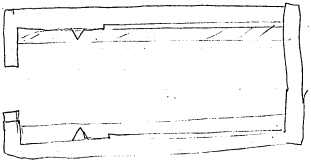


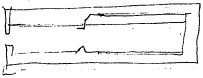
July 21 1908

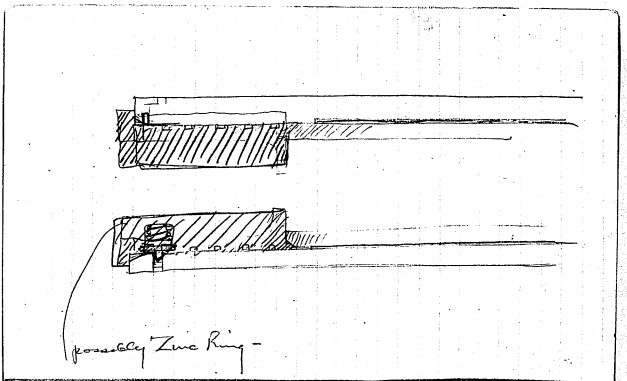
Ringer for pkg —

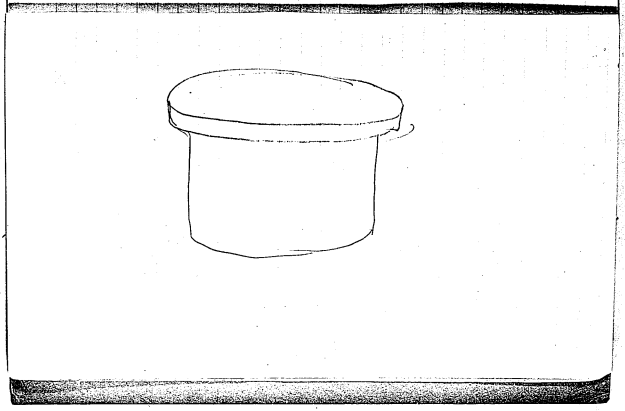
1st Asbestos
2 dead
3 Leather -
4 Paper - paper soaked glycerine -
5 Felt
6 Wool cloth -
7 Celluloid —
8 Heavy Vulcanized rubber draft
9 Hard Rubber -
10 Sacks

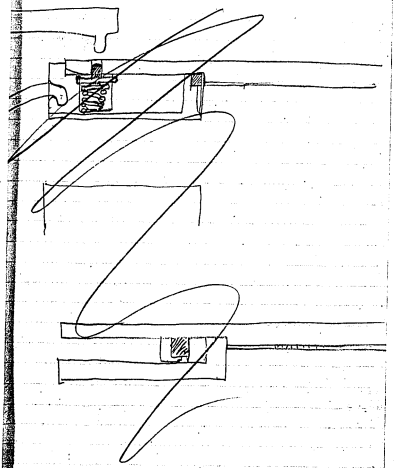
Testing these Sub Galvanized wire in Montana at 150 Fahr to see if attacked —

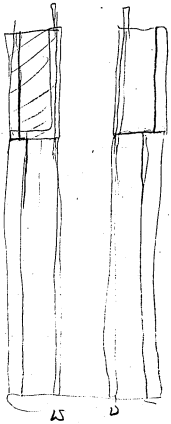


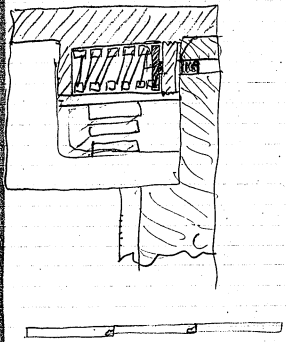



possibly Zinc Ring -







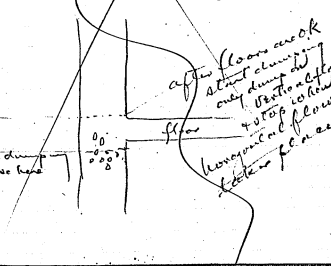


Three moulds at once

Jany 22 1908

New Orleans —

When pouring house with the very liquid Concrete 1 3-4-5 of 1/4 crush rock — Have a lot of 1/2 + 3/4 rock stuff on top of house & dump it Evenly on top of liquid Cement all around the house Then it cannot settle so as to choke the flow



If cloth is put over cylinder of new moulding machine spread the seam.

Jany 31 1908

have tried hot liquids to
toughen the 200 thread record
& perhaps can get it hard
enough for 300 or 400
thread if can get down
the wet on Rapidar

Neo Wax – dipped in Shellac
in Ethyl – dried 1/2 hour
air then put on mandril
loose over hot plate
turned it several times
till uncovered surface
showed loss of gloss

Jany 31 1909

Then took it off mandrel
after it had cooled
somewhat so found
Shellac film perfectly
worked to wax so with
heavy wt Regular didnt
come off Whereas without
the working it chips off
in flakes the shellac dont
stick to wax so it
wont stick even with
Bengal in the shellac
which tends to dissolve
the wax — nothing
short of an actual wash
will dissolve —
Tried Shellac dissolved

Jan 31 1909

Glacial acetic acid. I think this is tougher than an alcohol alone more flexible —

also mixed Kinalo film dope & shellac. This is of course tough but seems to give crackles —

Film stock dissolved in Sol they use at Edison Mfg Co for perfecting film was used, this has to be worked & then its good but very much more

Jany 31 1908

Crackling than celluloid
another feature is that
when welded & cold
its very electrical if
you wipe it with Cotton
it electrifies & fibres
& motes are attracted —
possibly can cure this
by adding Camphor
or some Salicylic acid
which gives off vapor at
ordinary temp —
or perhaps some morpeine
palm amyl acetate —
one way to weld the film
to record is by putting

Jany 31 1908

Record on reg mandril & then putting it 6" above hot plate rotating it now & then - Can tell when wax is at welding point as it loses its luster —

Another way which is quicker & probably well as the Comal way at least for Kinetofilm clock is to dip the Records let it dry thoroughly & then immerse in hot water for 10 seconds the heat of water being just right to melt wax to welding point — then chill the Record & sponge off surface & dry

I have dipped 4 moulds with shellac & shellac for Walsh to try Monday both in reg moulding dip process & spinning process —

If this dont prove crackling the film can be made as thick as we want — in

Jany 31 1904

dipping a record there is a limit to the thickness, the thicker it is the lower the volume of sound - but I find that with film dope of the right to that it is plenty tough enough when so thin that no difference in the volume can be detected

I find that water at 150 10 seconds will soften the record so film will cord to wax —

Its hard to say how long it will take to do it in air probably an at 200 for X minutes will do it = will make a machine to rotate it in the air of a closed chamber

May 31 1908

Making some Cupric ammonium
to dissolve Cellulose in it
& will get some Cellulose
Triacetate from General Electric
to try that —
Don't think Silhouette Soda (1 lb)
water glass is good —
binds affected H_2O + Cut
Saphire —
Will try Chromalyzed Gelatin
+ light — Low Otto making
Oomic —

Jany 31 1909

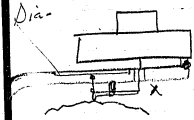
Will try Copal, Mastic, & other hard gums with & without Shellac or film dope

Some of the asphalts are very hard will try them on dipping Record - only as think too much gas given off of ~~[illegible]~~ put on mould perhaps if on spinning cause gas of decomposition blown away from face

Jany 31 1908

New Reader

Dia-

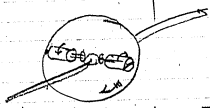


Dia on weight connected to end of lever X & put under strain

Thus showing follow record better / Walke will make

Feby 2 1908

Possibly after a record is dipped in film dope it will have to be put on a machine + rotated in two directions to distribute the film material Evenly



Cylinders turn slowly + at same time turn on their centers I hold this machine made once for distributing Japan Varnish Evenly over a plate surface — when film is dry the records can be taken off which is less than 15 mins

Jany 6 1908

70 72 30 Chrom crystalized as bought.
Sawed them with diamond dust
full checks due to crystals —

Remelted some in Electric F.
& threw in Water — made it very
Crystalline Leaflets — not for
our purposes —

Iron Molybdenum — same very
hard — had some checks that
makes it worthless for balls
Remelted in Electric furnace
& poured in H_2O —

Feby 6 1908

Took some 90 to 20 Borax which had fine pale violet Crystals Embedded in the mass I dissolved the whole in HCl & afterwards HCl & HNO_3 & found that everything dissolved but these Crystals I think there is ~~[illegible]~~ enough large pieces to make 8 @ 10/1000 balls for Mass Record

1 = ~~24~~ 50 Hermann Silver small plates take place of the brass ones.

2 = Hoffman - gallon Reg Var reg 6/4 nothing else - 4 gal 15% less than Reg 6/4 - same number of Resin -

3 = treat method Phenol resin with oxalic acid to turn the free phenol into thymol or Rosolic acid & then make Varnish.

4 = 26.6
1.333 trichlphenol
.666 + 50 mlg $ZnCl_2$

26.6
5 1.333 trichlp.
.666 Nitrain + 250 Mlg $FeCl_3$ cpk -

6 ditto 250 mlg Hydrosulphite
7 " 250 glacial acetic acid
8 500 Mlg $FeCl_3$
9 250 " $SbCl$ butter antimony
10 - 250 " Oxide Copper -

Moore 50 plate 30 cc Varnish -
2 " 50 " 60 cc "
13 " 50 Transfer wipe before printing with Castor oil damp rag 1st print wet & wipe with wet print & squeeze out to the limits or the labels only - 50, Carbon only around Edges,
14 50 Transfer plates wiped with Lanolin rag before flowing - only Lanolin

also double wiped Castor oil and Lanolin

[ITEM FOUND IN BOOK]

15 = Hoffman – Print Varnish Reg 6/4
nothing else, Absolute Ethyl nothing
Else, do it in 6 alle

16 = Dunwoddie, Make 8 more Matte
plates 1½ mm – Thermake 12,

17 – 26:6 1.333 666 + 250 Milg Picric acid

18 = 26:6 – 1.333 phenol 666 DEHaen
19 " 2.666 " "
20 4000 – " "

21 26:6 1.333 Cresol Screen 666 DEH
22 " 2.666, " "
23 " 4.000 " "

24 Hs rags – Turkey red oil, Lanolin, Olive oil, Olive acid
Tung or Chinese oil, Linseed,
Opium mound Ethyl –

5 – 26:6 – 1.333 Trichlorphenol, 666 Para
666 – freephenol

do 1.333 – free phenol
do 2.666 "
do 4.000 – "
do 6 000 "
do 10 000, "

7 = Print 12 transfers & wipe the
transfer with oiled rags in 4 places
individually see of hear it in
print,

28 = Lot blanks 231 – 4½ to 1 –

[ITEM FOUND IN BOOK]

29 = 26.6 - 1,333, Trichlorophenol 666 Pnnt
Evaptice very thick like Cooper
dope pound in Cruder + Spread

30 - get some distilled Pentta of
wood - evaporated Crude from Alcohol

31 = one pennt press, plates scrapped
to flat, make second from this
press,

32 = Dally in a vac for 3 or 4 min while wet
want most the alcohol go off if so
we could flow a plate put in Vac 4 min
then (ate out + put in racks - this gets
bubbles out, also - plys save most of
from going in room

33 = Try a cylinder around dried
plates 4" high keep drafts

34 = Moore What is effect if we
print red way but metal cooling
plate out hot + flat until cool again

35 = If we flow thicker varnish
why not tilt the flow table
more,

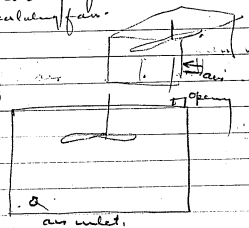
36 = Has new Denatured come + Varny
made,

37 = Pick out 48 thick one side thin
on other, test

38 - 48 Repressed blanks -

39 get some paper tubes
when plates flow put on rack + put
tubes around stop drafts

40 = put jet air in Ovens & a vent other end to dry quicker - like Dally with Circulating fan.



41. 26.6 - 1.333 Isoamyl of 333 Dettari.
42 26.6 1.333 Chinewood oil 333 "
43 = 26.6 1.333 Castor oil 666 "

44 = 26.6 - Nothing in but this,
45 26.6 1.333 Rosin acid 666 Dettari
46 = Halpin go down get 2 1010 2 1008
that has been inspected & put on trial.

47 = 26.6 - 1.333 Triethanolamine 666 Dettari
500 only Caustic Lime -

1 = Try condensing Pentacid by 6/4 in al-

2 = Try the little pieces of 26 & 27 that was highly Condensed with KOH see if it attacks highly Condensed Varnish

3 ~~Find some old records or plates without Penta, but of things see how~~

3 Test some of the little discs I saved (after hard condensation) in KOH,

4 grind a transfer with Rouge 1/4 wide for considerable time see what it does -

K. 25 - over Cook every h

[ITEM FOUND IN BOOK]

6 = ground in Record —

7 Try lumps quick lime in Varnish flow hardener acc if good perspective + KOH,

8 Hoffman – Varnish, 4% Penta acid 2 Mercks Para & absolute alcohol Enough for 6 plates & bottle Varnish for mic — print on polaroke 3 times Tonic —

9 = acc if Reg para melt & solidify Crystalline —

~~10 Try~~ on transfer try KOH, then wash 10 quick then strong HCl, —

11 Dry records, anneal at 180 + some 200 deg for Couple hours then cool slowly at least —

12 = Look How about ~~X~~ Vic attachment

13 = test the drum ~~X~~ washer

14 Look at Surfaces Victor records —

15 Has new Demetrad Come

16 = HOOP — Cause of bubbles on wax KOH on transfer is third in Curing in press the hardening make them by the reaction – Possibly slow hardening — ~~Oven not under pressure at 250 @~~ 275 is what's wanted to let gas come out,

17 ~~Reason~~ 200 plates – Reg Varnish with 1½% Anhydrous Ferric Chloride — this brings to rubbery state at low temp & let ammonia get out quicker ✓

18 = Try 6% anhydrous Chloride Cobalt to take care of the ammonia formed — Condensation

[ITEM FOUND IN BOOK]

Antiqua fwe can't get rid of
NH_4 + use Paraform or oxymethyl

See if any acid sulphate is
sol in water -

Acid sulphate of ammonia
Sol alcohol

or any acid salt which
combines to make the NH_3
non decomposable -

Try Sulphuric acid dissol

Green chromic Sulphate
dis readily in al-
form doubles with NH_3

Anhydrous Cobalous Sulfate
absorbs dry NH_3

ditto Cu

do Ni

Notebook, N-08-02-13

This notebook contains dated entries from February 1908 and April-June 1919. There is also one note dated August 1922. All entries are by Edison. The book contains notes and drawings regarding various uses for electromotograph technology, including sound apparatus for motion pictures and sound amplification for phonographs and telephones. There are also entries relating to experiments with various electrical phenomena, including x-rays and "xyz rays." It is possible that the 1908 entries were transcribed by Edison in 1919 from another book. However, the book bears a physical resemblance to other books from 1907-1908, many of which were used by Edison in Fort Myers, Florida. Most likely, Edison stored this book at the Florida laboratory and began making new entries into it after he returned to experiments on the electromotograph and the chalk telephone in 1919 (see N-19-04-20.2 and N-19-04-23.2). The pages are unnumbered. Approximately 140 pages have been used.

May 20 1919

William H. Haney
... STATIONER ...
Good Work Promptly
68 William Street,
New York.

Em.9

Carb Sr moistened with Aluminate soda – K Li

Cylinder Oxalate Lithia, after friction by arc light + shutter, Try X ray + shutter + use cylinders Cupro cy K, Benzoic salts, ignited precipitated $CaWO_4$ Wolfrimite also do precipitated, fluoride Ca precipitd – Try Radium also, Mag + E, Radiations of X passing thru slide crystals, ditto light + magnetism intermitted thru crystals of slides Use for light the arc Try light + shutter on Reg Sr Carb + all the other cylinders – Use dif metals etc for pressure foot, + dif specds –

Get shutter mechanism from Kinetos at Phono Wks old one make so get 300 second.

Put Emg in secondary where primary is on a circuit where electrolytic action going on Use high speed.

To detect high frequency waves, fasten a pocket cented dia which gives light by friction among themselves also to use magnetic cus [illegible] useful Bismuth on dia & Sb pointed wire — galv on rotation waves to light to hear bowed gives heat & E detected by galv.

Transparent Cylinder

Light shines thru to pen thru shutter

Iron cylinder, helix, magnetizing pens with various metals, use all kinds

Cylinder of Metals & alloys & pens

Cylinder of glass & solid Bi dissem Bi chloride

Oxychloride Bismuth

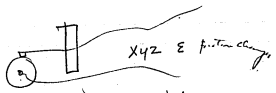
Oxide Bismuth

Black O & Cu by precip —

Sol of old Ether with Aluminum Reduces effects Emq

Carb Sr with Caustic Sr, this will absorb CO_2 + gradually fill pores make them finer + even dense
Denitrometer
This Carb Sr does when coarser pieces are used (12) $CaCO_3$ wet with Caustic
Alcohol =
After filled with Carb Sr try KOH, NaOH LiOH, K_2CO_3 Na_2CO_3 Aluminate Soda, K - Li -

Try polished aluminum Cylinder Coated heavy with Al_2O_3 by Current + dried -



Iron cylinder polished pressure jet non
rusting with all kind metals.
both cylinder & pressure jets
rotate high velocity also magnetic
etc

Use mercy cylinder & wet with
plating solutions, use only oxides
etc so plating sol has no action
on it try DC + AC induction Coils -
etc

Try Eng pen fused with very thin
non conductors like thin mica
mica can split use highly
polished metal cylinder
+ try all kinds of electrodes
+ sections of crystals that
can be got thin use coil
+ direct + XYZ -

also had permanent magnet near to pole piece both

from cylinder pen

permanently magnetized - Telephone working by polarization,

small circular tube to act as pen -

Use Bromide Lead for Emery Cylinder don't decompose with KOH or NaOH.

Wet cylinder Tellurite Potassium

Cylinder Cuprous Chl PbCl use other things than an alkali use neutral salts

~~Copper~~ Ferro & Ferricyanide Copper Zinc Lead Tin & all metals for Cylinder also all Cyanides that are stable -

Carb Sr

Try mixed RO H, Neutral
Salts all kind to wet,

Use Bragimals, CuS. pur + cyclus

Try all the Oxychlorides for
Cyclus

also stable precipt. acid sulphis

Try Orpiment Realgar -

Peroxide lead precipitated ditto Per Ox Mn
Mn_2O_3 precip Co_2O_3 -

Peroxide Ba Ca Sr -

Antimonate Soda

Arsenate Iron + antimonials
which must -

Vanadates of metals = Vanad NH4

Uranate Na K -

Tungstate Bismuth precipitated -

Stearate, Meerschaum -

Carb Lithia,

Iodide Cadmium -

Iodide Silver
Chl Ag
Br Ag
Sulphate,

Thallium Cylinder + pen -

Pens of Natural Conducting
Sulfides — Arsenides +
Fry Magnetite - Native
pyrometals - Red phos -
Phosphides, — Vanadium
Oxides Mosaic gold Sulfuret Tin

Res of Eng affected by Temp

Moisten Emg with KOH NaOH LiOH
containing metals heated on Sol by
Citric + Tartaric acids - also Oxalic

Try Acetone,

Insol Hg Salts,

Powder thru 180 mesh all
Kinds Crystals not development
moisten slightly press under
300 at + not Chem for Emg
both Ruby & hydrate
also Organic - & also inorganic
after all but last water
drawn off -

Flashing powers
Oxyfuel Mg ~~Zn~~ also
oxyfuel Zn
Sulfuric Compound
Dilute phosphoric + ZnOx.

Carb Sr + West with Hydrocarbon
& Organic Compounds –

West with Hg Cy also Hg Cy + K –
also other Double Cyanides Excess K.

West with Bichl Hg – ditto Silver Salts in
NHy – West with Sulphide K Na Li –
+ other Metallic Sulphides Salts K Na Li
Ammonium fricies K Li Na –

Also KOH Na OH. in which Chlorine
Br Iodine Chlorate perchlorate
all according oxide due to oxidation

Dally draw tube then as possible of
Lead Glass

same size as

Reg Eng Cylinder shove over a
metal Mandril with little Copper
amalgam to set + hold it
then use pen or it will act as
Condenser for high frequency

Ammonium Magnesium phosphate,

Eng Mandrils plated with all Refs metals that can be plated – also metals & Sulphurizes surface & either deeply ~~[illegible]~~ also Ja Se P. Iodine,

Where cant plate, put pieces of conducting substance against End of Chuck & cover or fill made out of conducting matter —

Where stuff is small use insulating Mandril + Extra pen

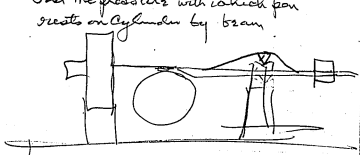
Use Cadmium –

Try Eng on California Cable –

Make accurate measurement
V + Amp - Limit of action +
other things

Cylinder Hydrical Tungstic acid
Silicii. Telenuclaphosphatic Na
K amorphous arsenious acid

Test the pressure with which pan
rests on Cylinder by beam



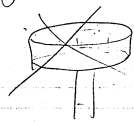
Turning until sound Ceases

Paint back of pan with various Colloids or other matter finely divided - organic materials fine precipitate -

Insert cylinder Sintered Well Charge pressure take the resultant in pores (10) Ferrous Cu Ferrous plus Silica hydrate, Chromic Etc -

Put wire on flag pole & run down to lock on pole -

Try Energy on Chelsea Cable



Try dup Coils high & low Volt
Try very low 1 loop around
non 1 loop ~~[illegible]~~ Secondary

See – Aluminum from NaOH, prepared as phosphate – R T Thomson
Chem News 54 pages 252–253 –
Chem Soc Jnl 1887 – p 182–183

Test for Al_2O_3 in NaOH, by Mellingtonangs – Chem News 55 289 – Chem Soc Jnl 865 1887 –

Sol containing Na2O & Al2O3 (as oxides) with Indicator as Sacons of [illegible] Methyl Then Ferroacyl K Indicator down till the indicator turns red of Al2O3 – 4/100 ccs of gram Mon electrolyte.)
Zeit, and Chem 25 519 –
Chem Soc J 1887 183 –

~~KOH or NaOH containing an acknowledged phosphate, yields an alu~~

Catalytic

NaOH, + formaldehyde —
gives vomiting any qnts of Cu Ox
put in violent production Aqua regia
or fused hot alk Formate Na
~~qnts~~ produced —

---

good — Chlorids desired in
15 parts amyl alcohol —
KCl - 24000 pts + NaCl 30000
parts,
amyl alc added to mixed chlorids (concentrated)
mix heated gently at first until
water driven off then raised to
boiling temp of brine — K + Na Cl
are precipitated LiCl passes in solution
liquid now allowed to cool
few drops HCl to convert any
LiOH into LiCl then the solid
again to drive off H_2O —
F A Gooch Chem News 55 p 18 to 79
J. C. S. Soc 1887 528 529

H_2S precip Al_2O_3 in cold from alkali
Soc Chem Jnl 1879 p 437

Milk of lime throws down Al_2O_3 hydrate
from Na or K aluminate –
~~Unsigned Essay~~ –
Jnl Chem Soc 1879 490 –

Protosulphate from dis a crystalizing
from Boiling sulphuric acid

Will KOH solid dissolve an
alcoholic solution with
ammonia precipitate
the Al_2O_3 out –

Try on KOH, little silicate Na 4 parts
H_2S to form ultramarine
Does throw down Al_2O_3

For obtaining Very large Crystals
Chem Soc Jnl 1879 352

Lead Iodate is far more insol
than Lead Sulphate - try Iodate
in our KOH & NaOH sec of
prep also after boiling out
Reg of Hlx in KOH, also
on new Sol after 1st Run after prep

Lum Oil, ~~Fixed~~ to 175
some Iodell K wash
N°2 prepn to wash well
4 Marks prep

Equal Vol of Ether + Alcohol
dis Li Chloride not other Alkali
Chlorides —

Distilled H_2O has lots NH_4

to get it free of NH_4

See Chem Soc J 1879 878

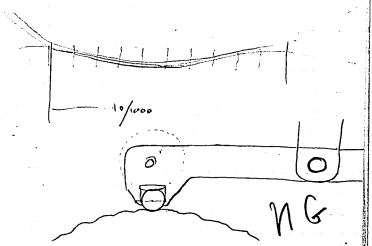
Feby 13 1908

Kinelo-film Mfg to keep gelatin film stuck to Collodion - dissolve some Lithium Chloride in the amyl acetate dope - Not K Chloride are practically unsol. in Sol 15 pts amyl alcohol - This is hygroscopic & will cause gelatin to stick -

Also work up in the dope 10 or 15% of finest gelatin then on drying Collodion film will have Microscopic mixed with it finely divided particles of gelatin & when the Reg gelatin film is poured on it will stick to the gelatin particles which happen to be on the surface of the film & as these are dissolved by the Collodion it will fasten the film firmly

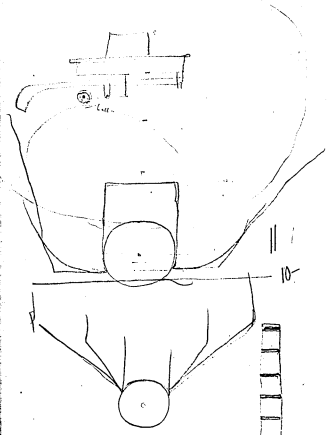
To strengthen the film add to the dope semi-nitrated Cotton so that there will be long ~~[illegible]~~ fibres —

Phano Repsr Feby 13 1908



Revolving bell repeat
Walke line of most frequent

Pass powerful Current thru
Metallic Uranium see if increase
radiation, with Uranium Salts
(Crystals) dielectric streams also
Powerful Mag — photo of Electroscope



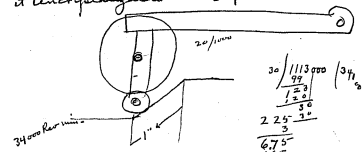
6' 1113 inches

30 | 1000 | 33.
90
100

165
33
495
495
5445

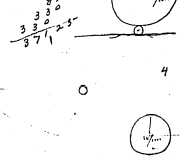
Feby 13 1908

Sebacic acid in Mountain wax is the higher acid of the oxalic group — it used to mix with Stearic acid to render it unexplainable — try it —



30 | 1113000 | 37 1/30
90
123
120
30
225 30
3
675
165
3375
4050
675
1113 75

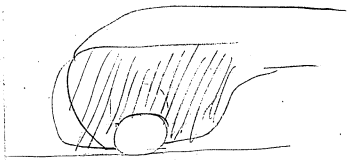
165
2
165
225
825
330
330
371 25



40

4 $\frac{1}{5}$ th the friction —

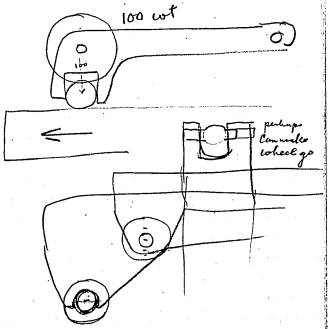
Think that the Benzine sol part of Bull S from Oil Tanks will make almost any wax unexplainable & longer it



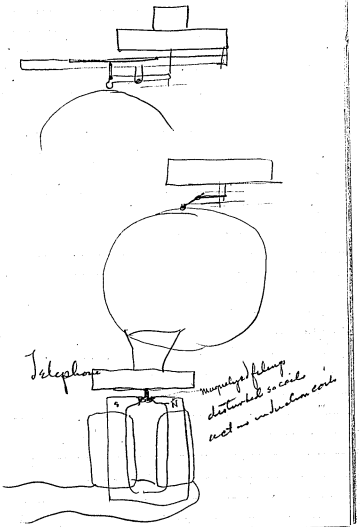
Possibly Know way
but doubtful

Feby 13 1908

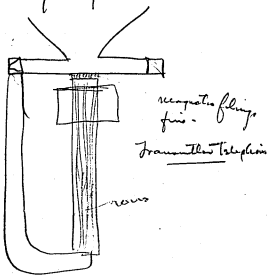
on 200 thread Screw & 10/1000 ball
if rolling will make 30 000 Rev min
500 Rev second, =



Feby 13 1908—


Telephone
S
N
magnetized filings
distributed so coils
rest in induction coils

Feby 13 1904



Feby 14 1908

Kentile film to make gelatin stick to flow the Collodion film. Have when dry wash with a powerful reducer such as that by Sulphite. Only made to remove NO₂ only a little on surface & bring it back to Cellulose. Wash free & dry then flow over the Emulsion. It will stick OK —

April 18 1919

Notes from old pocket Memo book

Nitronaphthalene with excess of Shellac Melted + poured out on plate shows signs of Nitro Crystalizing after several hours + after 24 hours at ordinary temperature wholly Crystalized + the Shellac mx is now very hard, if flock was incorporated it could be moulded into Combs, Billiards etc = it fills the O from NO but does something Nitrophenol — Wachow Camp as it burns clearing also

See if any ray comes from a X Ray tube that is exhausted so high nothing goes thru no X

Perhaps Carbon, Tantalum, Osmium Tungsten Lamps at high incandescence give a ray other than heat + light.

April 18 1917

Intensify suspected source of ray by a shutter allowing the ray to strike two very sensitive diaphragms with securing tubes — Diaphragm plain or have crystals attached, Try Radium, Thesslhorm X ray

Acetylide of Copper in Lebiquide,

Form Tungstate Calcium by fusing the precipitated salt in salt and when its cooled to a point where the crystals are all formed quench it suddenly This will put an extra strain in crystals & be more sensitive to X ray

Mr Bon says sulphide of Zinc very sensitive to Ultra Red, will photo beyond visible red 1/30th of second its green —

Shellac treated with Borax then washed well. Then treated with acetic acid a little — washed & dried it now no longer dissolves in Stearic acid or Naphthalene, although 85% of original Shellac is the result. Why is this ??

Tetrachloronaphthalene can be entirely decomposed by boiling a long time in water to HCl & a Resin — ??

Aldehyde dissolves Cyanamide the mix after 24 hours changes to a body resembling Copal soluble Alcohol, see Watts 2nd Sup.
Cyanamide is now cheap try it.

Subject Uranium salts to X ray & Unity see if radiation increased

Hydrochloride of Phenylhydrazine sublimes in lead pt. Make reduce metals, flake for battery.

Strong KOH saturated with lead oxide on cooling gives scales Chloride Ni should be reduced to oxide Ni + PbCl. then OxNi reduced in hydrogen for flake for battery.

Dioxide of Molybdenum Crystal Conduct Elec not affected by boiling KOH. Watts 1st Sup

OVER

p 832

Watts 1st Sup MoO_2 fuse Molybdic in porcelain Crucible 1/3 wt of Zinc add small portions at a time heat till Crystals spread out from Zinc & fill whole liquid. Cool off & digest alternately with KOH & HCl wash with water.

Dark blue violet possess strong metallic lustre. Conducts Electricity well not attacked by boiling KOH or HCl

Chemicals insoluble in Alkalis

Cupric Antimoniate $Cu(SbO_3)_2$
Mercuric "
Lead Arsenite $Pb(AsO_2)_2 \times H_2O$
Silver " Ag_3AsO_3
Boron Nitride
Lead Chromite $PbCr_2O_4$
Magnesia "
Zinc "
Ca "
Iridium Trichl $IrCl_3$ anhy
Lanthanum Hydroxide

Molybdenum sesquihydroxide $Mo_2O_6H_6$
" Mo_2O_3 also Mo_3O_{12}
also MoO_2

Molybdate Mg $Mg_2Mo_3O_9 = 2\,MgO\,3\,MoO_2$

Potassium Sodium Columbate
Columbium $Di\,OX$ Cb_2O_2
Platinous Cy
Ag Cn
Didymium Hydrox
Erbium "
K ferrite
Ammonium Ferro-hipo sulphide
Calcium Ferrite
Mercuric Iodate
Mercuriammonium Nitrate $2NH_3\,2\,HgO$
$N_2O_5 = NH_2\,HgNO_3 + \frac{1}{2}\,H_2O$
Ba Ca Mn ferrites
Di Mercuriammonium Carbonate
" Chloride
" + Mercuric Chloride
Cuprous Sulphacenate
Mercuric Sulphide

Anthraquinone insol in KOH, hot.
not oxidized by mixture
Emeraldine from oxidation of Aniline
with HCl & KChlorate, is insol in
KOH

Phosphate Alumina not
Decomp by boiling alkalies
EMCP

Apatite, fluorite, etc. phosphoresce by
heat. Try using them as Diaskeuastic
Keep them charged electrically
When not to see if they work
Continuous phosphorescing permanently
also chg + dis vibs –

When excess of Lime water added
to platinic Chloride + exposed
to light, a white or yellowish
precip is thrown down

X42 globule CS_2 suspended in a diaelectric subject to Magnetic ~~stress~~ & Electric stresses + amplified by 30 ft perspection on screen, result movements are given by Ultrasonic stresses or Constant stresses + beams of light X42 + X ray

Sun Engine CS_2 two glass tubes inner filled CS_2 blackened walls - outer tube Invoer, Vacuum between a la Thermos bottle CS_2 Vapor to drive turbine - CS_2 could have taken in it asphalt!

Method of preparing large regular Crystals.

Sol of salt from which crystals desired so concentrated that some Crystl out in 24 hours - A well formed Crystl is picked out & laid on a plate glass which again is placed in

A glass dish, upon this is poured the mother liquor to which a small quantity of fresh salt has been added. Alcohol left to cool in a place of room temp.

This treatment is repeated every 12–14 hours until crystal is of desired size.

Sol should not be too conc as crystal is liable to grow irregularly if this happens it must be turned over on the plate & small adherent irregularities removed by regulating the position of the crystal definite faces can be made to increase. By this process got Chromalum by weighing 3 lbs

Chem Soc Jnl Abstrad 1879 352

Apl 28 1919

Try hardening of Carb Stroulen Cylinders of EWQ by soaking in $Sr CO_3$ water and drying or perhaps better soak in Sr Hydrox Sol^n let it dry in CO_2 gas - This will fill pores to limit a few more than more pressures if OK see how far can go -

Perilla Oil polymerizes like Chinese Wood Oil ∴ C W oil cost 8 cents before the war now 18 to 20 ¢

Starch, Dextrose, Levulose are Aldehydic Carbohydrates + will act as a substitute for Hexamethylenetetramine

Names for Musical Instruments

Harmonola
Melodophone
Apollino (quick)
Concerto
Concertola
Concertofo
Cantate
Cantatola
Cantola
Autophone
Audiophone
Bandofo
Cremona
Bellcantola
Cantonello
Chantor
Choraleon
Concertina
Consonanza
Dulcina
Eccola
Donatola
Impirator
Legattola

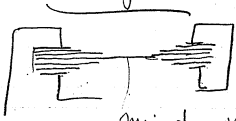
Cantophone
Lederphone
Lyrophone
Melodola
Symphonola
Tondola
Musicola
Pandola
Orchestron
Sonola
Sonophone
Troubadour

Apl 28 1919

Al_2O_3 Hydroxide sol in Caustic Barium
(its used in tests) it is also
sol in Ethylamine

To test this try a small Al
Rectifier if it prevents rectification
its OK for regenerating Battery

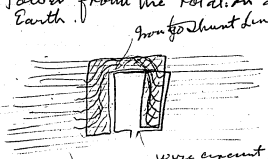
A glass tube 3" surrounded
with sand is perfect gives
no echoes - tried it it's OK.
Sand surrounded funnel
should be good.

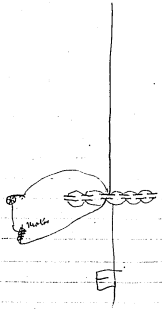


Mica disc very
sensitive but dont give big amplitude

April 28 1919

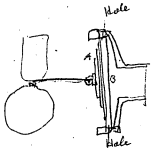
Power from the rotation of the Earth.





1. Sandr

Resin from Canada Balsam & also gum Sandarach not soluble in alkalis



Eng - Double dolphin A & B

The holes at edge prevents sucking of one dia by the other as friction movements of lever is slow

Carbamide destroys passivity of Nickel in KOH

K & Na precipitated quantatively from alkali solutions by Hydrofluorosilicic acid which has absolutely no action on alkali salts.

EMG

Try the old 4" dia stiffening in Center sec of Bender than small one now used —

Should try a clockwork drive & also a monomotor Electric Drive for EMG

Fill an A4 Cell (B 4 well dia) full of Magnesia MgO ignited about 180 mesh on 150 but its running This has never been done properly but may show up some phenomenon favorable especially with Bi

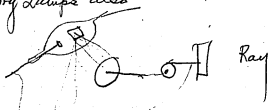
After an EMG Cylinder has been pickled & get sensitive Oil the whole with Straw Oil & see how it works This should prevent water Evaporating

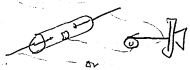
EMG try NaOH + KOH with other salts dissolved therein by Sadamido

Rotating Vac Tubes

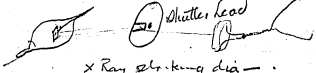
Emg – def lines under point of pen rotating on glass,

Dry Lamps also



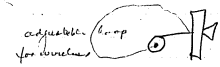


or



X Ray stroking dia –
or a Carb microphone dia & Carbon –

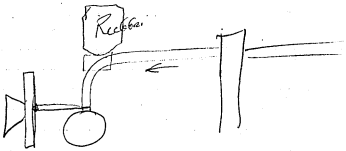
All kinds stunts



Crystal Crystal undergoing should give off energy - a ray etc try attempts with this because if conditions are OK especially if crystal is in a dielectric you conditioning DC something besides heat must be evolved

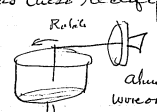
Possibly to get quick results many salts some complex 'Gases put in at once

Also should be energy as a ray etc from precipitations,



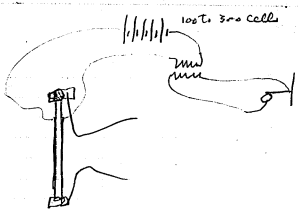
Wooos condensation & manufacture comes over wire should change friction on Chalk & glass conductivity

See what can be done with EMG as a transmitter disturbing the polarization current standing & also running using Bell & EMG for receiver also of solutions & also Aluminum & Tantalum points in these rectify more

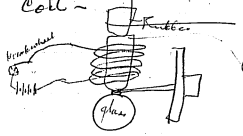


Aluminum or Tantalum wires or sheet, & phosphorus etc

Alternating currents see of 924 & 925



two Drafts 1/32 apart lengthwise tin foil on outside / Earth - vibs vary the capacity try to ewg direct also without coil -

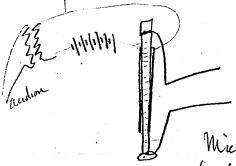


increase & decrease friction by squeezing also try alternating currents by using coil - metals & organic things

glass plate, change plate, when comes around
EMG displays effect + gives kick by allowing
precision - Tiny Ultra V. Radium, X
Etc, Shullers

powerful current
drive the K ion thru the
dia into the phenolphthalein indicator

K very thin Ni or Silver,



Mica dia - 1m foil
such acids —

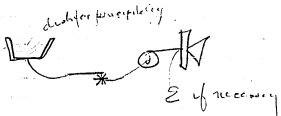
Vibrations of dia ~~of~~ Mica, deflects
charge

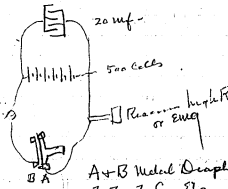
When wave comes
+ no self induction
at Chalk

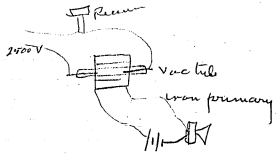
Current opens when pen anode
+ lets Current flow to X

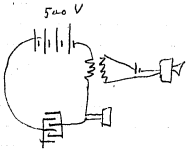
For screens holding Crystals so rays
experimented on need not go thru
anything use Sheetch silk
Bolting cloth 20 mesh —
Sift the Crystals + put on by
Varnish. Do some parts of Crystal
has no Coating on to deflect the
ray These for experiments with
XY Radium X, Uran & C

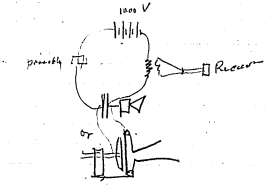
Determine Constants of Cast
Emg — Res still Res
running — Best pressure in oz
pull on diaphram at this pressure
Nature of the Current Coming
from it stepped + relating
+ all the Constants —
Also if it is current or
~~Elec~~ Voltages needed

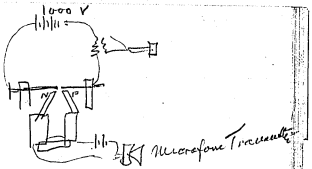


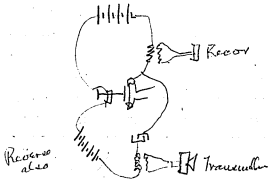



Receiver
2400 V
Vac tube
from primary


500 V


1000 V
primary
Receiver





Possibly examples of Mica
David Fulton glass cellulose
& others. Crystals also crystals
that give voltage by pressure
also Zinc Sulfide discs (PE)
electric ceramics.
Cut from crystal & place dessus &
put by metals on each side & tap
to get current until glass one (pour)
through a plate electric current

See if ~~pulling~~ right kind of impurity in Tungstate Cadmium fluorescence can be increased

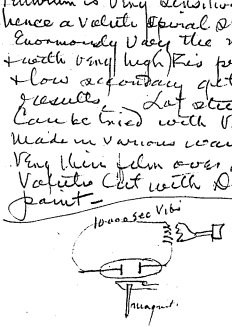
Investigate the Clay smell

Run down the friction of paper over ~~tin~~ Tin when platina passed over. John Ott made a wheel with dif metals find it.

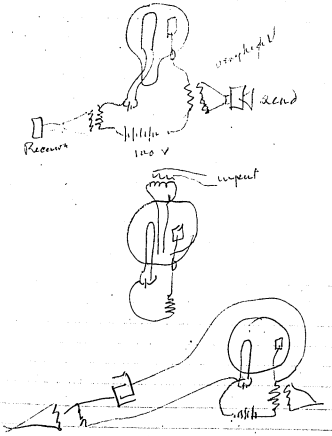
Find the XYZ apparatus John Ott made,

Use hard rubber decahedron paint a volute spiral on face with Tellurium, Bismuth, Selenium, Barium, graphite etc Current heats, The disc will create cold & heat & vary res - with Carbon it will vary contrals

Tellurium is very sensitive to heat
hence a valuable special should
enormously vary the resistance —
+ with very high Res primary
+ low secondary get good
results — Lat attempts
Can be tried with valves
Made in various way — possibly
very thin film over glass
Valves cut with Diamond
point —



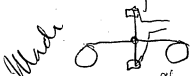
It may be absorption of OH + H in palladium or Ni or Zinc may be an important factor



See if charged substance held near Audion bulb affects it
Ditto magnets + how much

See if current in audion when no battery on. If no Elec there must be something + to XYZ test for it
Some chance for stands here with Crystals + XYZ Rectifiers

Make Emg with 2 chalks
1 Dia

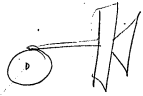


Try in series + multiple –

If a chalk gives a current which 1 chalk against the other to spark or double it

Test absolutely on box with variable currents flowing or no current also with + without condensers

When got good chalk working to most accurate point on box see if any of the lines would increase by raising Voltage gradually –



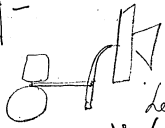
Magnesium cylinder oxidized slightly so short conducted metallically & tested with KOH,

ditto Aluminum Zinc Cadmium. Tin & other oxidized metals

Also tried by Electrolysis

Lead Mg Ele

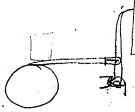
Emq –



leverage on Emq

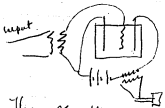
Made
Aug 15
1922

Make more sensitive diaphrms for Emq by stiffening Center with Aluminum Cups so only the Edge flexes (16) 1/16 alup 1/32 – but use rubber rings



leverage

If con theory right. this

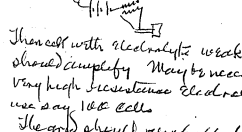


Then cell with electrolyte weak or strong should amplify. May be necessary to have very high resistance electrolyte so can use say 100 cells.

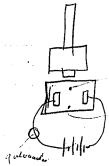
The grid should probably be a substance quite different from P so must off

Current go on P + not on grid

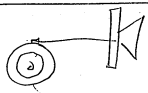
of aluminum + P of ——?



a Deposit iron on a or b from solution, use permanent magnet

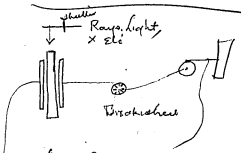


Hg - pivoted lever to accurately balance



Mica 0.001 thick

Put coherer of high dielectric
Capacity but conducting —
pass alternating current high
Voltage through it and Cohere
Now insert a rectifier in this
allow 1 way electrifetn of it
Coherers



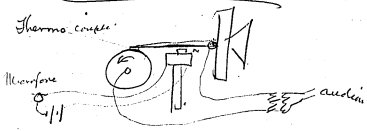
also Crystals.

Try sides of Chalk mounted of Emg
of different metals, not same
Solutions, want get chalk to rectify

Continue Expmts with lif salt
than alkalis

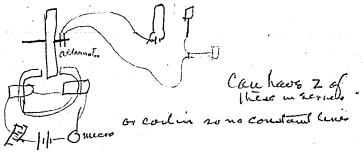
Also make cylinder of solid fused silicate soda work not hygroscopic, various proportions.

Mix silicate soda sol with various powders say $SrCO_3$ chalk etc



Have magnet vary pressure on cylinder to increase or diminish thermo current rotate at rather high speed + have very light pressure on levers so only magnetic pull – Really no need of Graphite, as audion used

try Tellurium + test thermos –



The trouble here will be to create a field without having any lines when micro not working –

Conceal Tin wire if it can be smelted also Iron Mica, Run down the, lessening of friction on paper lead over tin when platina spatula rubbed over, There is some emanation from Tin, Think John Ott made a wheel with several metals on face to try this, connect to diaphragm wire if get a knock when rubbing

(Probably Chilled Tin not crystalized)
will give ray better than Tin already
Crystals ray may be due to
gradually Crystallization,

Sulphur may do the same
thing. — Could try various
things, due to S Crystalizing
Could pour it between plates
+ connect them with various
instruments also without
plates test for a ray —
Sulphur will be a fine material
for this kind of experimenting

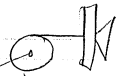
Also Liquids crystalizing.
Could use depositing solutions
like Z Anode & Cathode in
Conc sulphate Zinc Nit
+ nitr Solends etc on
Crystalizing — using various
detecting instruments —
photo plate —

Try Chilled Zinc + Chilled Tin
then black paper, Mica & our
Shale plate Reg & for Red long
time exp of pulse.

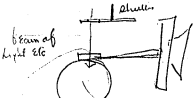
Try Audion & try effect of
rays from dif substances
studying the air space also
grids with 256 second shutter
see if Electrons affected

Use Edison effect see if
Current affected by rays Ele
also magnet, Crystalizing of
Sulphur,

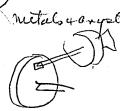
Try packfull of 50 mesh
Ox Magnesia see if holds
charge better if it does try it
in a Bismuth N. OH. CaCl



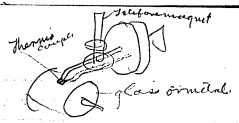
high speed – Coat with good dielectric varnish thin. with some pressure on pen see if current & XYZ effects it thru shutters –



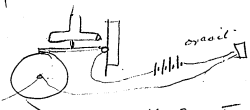
Transparent metals



Uranine may give out a ray



Pressure put on just so overbalances pull of magnet, Cylinder rotated high speed.



high speed, get smoothed metals etc that will make the magnet control — Very constant with voice, see if articulation OK —

Aluminum Plate 1 x 2 put in Rectifier solution & formed for 1 or 2 minutes, both sides do several. Then wash well & dry then graphitize - then plate, Copper or Nickel over graphite. Wash dry here iron will poly have a rectifying Condenser in air

Try input into 3 stage without input coil Microform direct + use no magnets, see if amplify

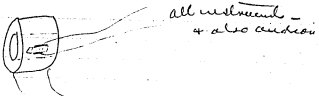
Old Etheric - Use big break wheel a Coarse wire spool, the dark box & zinc rod also try fact on glass rod + get old sparks. After getting original results, adjust lamp wire and dark box, use an earth after getting spark put in phone, if nothing use bulb

For other rectifier if get nothing use EMG + rectifier + settle what it is –

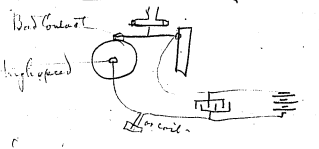
Try pour shellac between plates containing tetrachloroanthracene Dinitrobenzol Naphthalene slow & fast crystalizing & see if nitrite comes from them or current or electrofication

Also melted anhydrous salts poured on plates

$AgNO_3$	MP	217 Cent
$HgBr_2$	"	242
$HgCl_2$		293
$LiNO_3$		267
$SbCl_3$		292
$NaClO_3$		302
$NaNO_3$		316
KNO_3		339
Na Nitrite.		



powerful alternating Currents
Crystal with Electrodes, also – 2 metals together –



Best stuff for make Cu O plates is Iron Oxide (Ferric)

Flatten Crystals 1/32 thick 1/16 wide – place between 2 flattened points in double room spark coil current then also straight current 300 cells – see if fluorescence –

See if helix or electrofication of a Cathodray tube effects heights

One foot long iron wire inside a helix – one end fastened solid the other end touching a microfon diaphram and interrupted + also alternating currents + listen in audition also try other metals,

Investigate rapid appearance of heat in long aluminum bar heated + suddenly quenched

Try Bone black in Emery –

If Can get a telephone soft iron magnet core to work can make the magnetic amplifier work try –

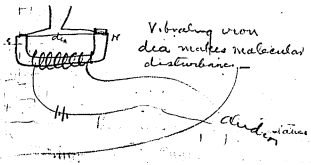
Make a Condenser like we had on jumbo machine, since our fuse & lock Multiple arc Storage but to get 1200 to 1500 amperes + alternate to see if can get the 1/4" spark – possibly it might take place of pulsing Coils

Open up a W Elec Condenser and have to make.

Patent Arsenic Soda for stripping from Copper

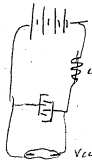
Try slaked lime for Eucg Cylinder
it can have to precipitated out by
alcohol —

See if we have checks of
Cadmium Hydrox
Ni Ox (not hydrox)
Mercuric & cus oxide
Bi Ox
Ignited aluminum Oxide.



This should show if any part of
Bell-phone results are due
to Molecular changes —
idea soft iron & no battery

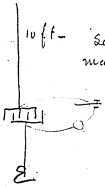
several hundred cells

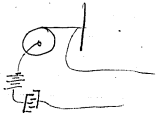


Buy that special book on Drying Oils —

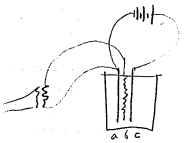
See Watts Dic Linseed oil —
1 pt Linseed oil 2 pts Concd Nitric A 4 pts water.
heated, swells up, gives nitrous fumes & dries to tough Elastic Resin, gives other methods,

Phosphorescency non conducting
imbalance between metal plates
see action of light - if current
or electrification,

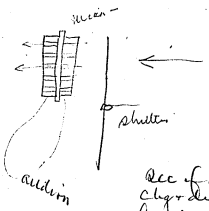




Will the two cells strengthen Reg
Emag talking



a+c plates very close together in non electrolyte — also for a very poor electrolyte. b to a plate grid, see if any compli

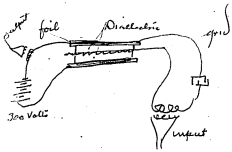


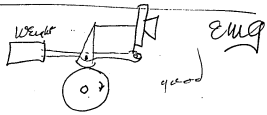
see if light affects charge density
Condenser

for speaking pictures, use phones
for recording & replay - all connected
to shaft of phonograph so no
synchronism required, use carbon
or Emq amplification -

Make time tests with limits
read on box of East Emq
Closed in box with sponge
while running & also
not running see how long
it lasts - & fall of reversibility

Get lot of Silicates used in alkali
by double decomp for Emq
cylinders -



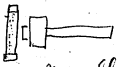


See if good cupric ammonium solution that dissolves cellulose will dissolve fully condensed formaldehyde.

May 22 1919
Entered from last book

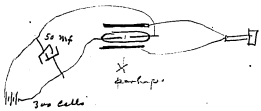
Collect all the xyz apparatus made by John Ott

If there is a double sulphate of Iron + Magnesia or Oxalate etc Ignite to Oxides reduce by Hydrogen + test in alkaline Smalt cells. The idea is to prevent shrinking — also try mixing of salts to get different proportions of magnesia.



Microphone carbon granules of which 1/4 is from 3/4 Carbon see if sensitive

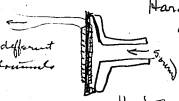
Try Jubalong, Pontiac mixed with Rosin instead of linseed oil for powder to mould disc blank



I got the several hundred alloy ingots I have for different things —

listening device on ships provided with Trompe like Marie leading Iron tube to any Trompe & memory index — to detect slow waves like Screw or displacement waves

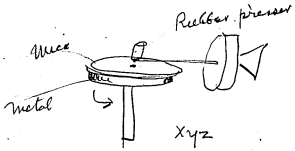
diaphr
Wire 3 Mf Condenser
in closed space
Listen when current
ac —



Hard rubber diaphrm
armored & each
side with foil.

Hard Rubber Very Thin —

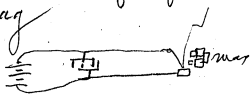
Fill a small test cell with
MgO - ~~on~~ 5 then 50 on 100, ~~to~~ see
how the V & Capacity is —
If OK try large Bismuth in NaOH's
Cell —



Rig up an Acoustion with gasoline + see how sensitive.

See if fluted light in Vac tube is sensitive to influences

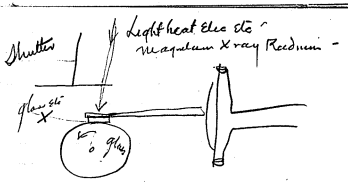
Make the sparks from different Metals + see if deflected by Mag



X ray also Radium particles
hit end of long steel wire
to transmit a Conversion-
detected at other end say ?

Look up Ether in 1873, 4, 5 –
+ see if in Electric, scientific
London Engineering + English +
Especially Scientific American
+ see where S P Thompson got
his information from in his
paper in Philosophical
Mag

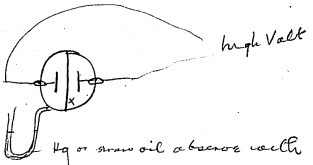
Condensed steam with
Excess of 6/4 + Especially
Para at the Lowest
possible temp to get rubbery
stage + then find a Solvent
for use as Varnish
Try 110 Volts long time,



Shines through glass, Mica, & Crystals, & alters frequency the shutter giving vibrations heard in the phone -

Also instead of glass Mica etc at X try metals & X ray & other sources of Energy Controlled by the shutter -

See if Energy is more sensitive to waves in form of high or low voltage. Use Bell Receiver instead into the various Bunnell Coils high low Secondaries - Measure on box



Microscope — CO_2 gas — absorbs
Osmos in gas thru porous diaphragm
X also diff gases exch and de

The Ether is atoms vibrating at all periods from say 80 to 180000 miles second —
These vibs give no light or other Evidence Except when they proceed from or strike matter Li gives when struck gives its rate K another rate — This in its turn sends into the Ether a preponderant lot of vibrations at the Li rate,
+K at K rate.

Use Mica diaphragm to which is fastened different sections of Metal Compounds absorbing light heat etc + pass monochromatic - with a revolving shutter say Na light beam used then use best substance to absorb Na rate - This should vibrate diaphragm Na would be best - find substance lets all rays thru This should be in resonance - If in audible use Micro, Acoustron, Thermo, Audion Even a water phone a la Submarine having Chemicals that absorb the Na rate using Micro + Audion

Diaphragm of 2 diadectics highest + lowest capacity with thin foil armor Connected to incoming waves impressing a current on 1 armor to Earth other to Voltage the highest capacity diadectric

Expands the most this bends the diaphragm also no armor + Rayo[illegible] with shutter with or without Audion-+ microfon

As pure iron in Bell telephone requires an initial energy before any attraction is shown but ok when its magnetized hence for very weak current a closed ring permanently Magnetized should be more sensitive for weak currents or a battery inserted + CP iron used in ring.

It seems to me the input + output leads of audions should be permanently Magnetized

Lithium Potassium Salts of feeble acid oxides that are insoluble in alkali

BiO_3 – LiK

CO_2 – LiK

UO_3 LiK

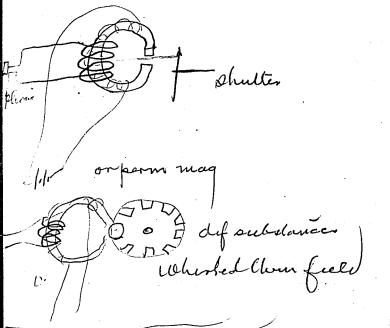
NiO_2 – LiK

Potters Na Salts –

EMG did I make Carb Li

Beryllium Ox – do Carb B

Carb Hg $Hg(OH)_2$


shutter
or perm mag
dif subdances
Whirled Chem field
double power
Emg
wound
Uniform

When listening to a water phone sink a small rubber balloon near it & blow it up see if it diminishes Volume

If I can get chemical paper sensitive enough could with 5 Tunings & Auchors to Each - form Roman letters like old automatic & get high speed recording

for chemical recording use plaster paris cylinder on Reg # 30 machine -

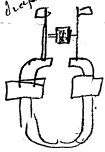
June 3rd 1919

See if a photograph plate moistened with a conducting solution P + Neg pens made by side will leave a record on passing Current in dark — Dry plate —

See if an oscillating system Condr made 20 000 to 1 Million sec if so try Crystals in dark.

Use a Emg chalk soak slightly in Oil or liquids insol in water when dry then wet with KOH in Eng way + see if Pot results — possibly results gen Pos close to Neg + high Res also try high Voltage + many liquids Mod Condrs + strong Currents + see if works without KOH.

Wet Emq chalk with KOH.
Coalaming colloids like ferric
Silica Alumina gelatin
Albumen Caramel gambooge
See if improves scintillances
of Reg Chalks



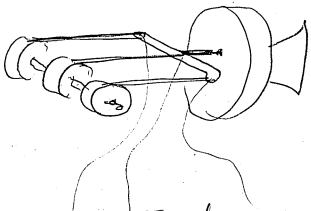
Magnetic Microfone

Try Aluminum pow +
phos soda or other quad
Hectifying Sol

See if Emq has a rectifying
action Especially if Manduck is
Aluminum factor phos Na used

Between poles of an alternating current mag - poles powerful in dark room, (City Current) place Crystal see if get light. The X ray bounds of Crystals 600 cell Electrification,

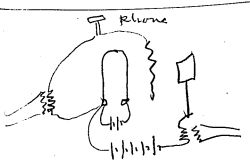
also shaft + plate from Condr Edge between poles + crystals def kinds at Edge + rapid rotation

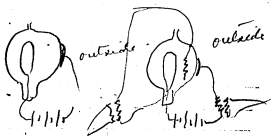


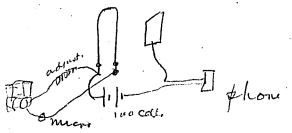
3 Micro 3 water phones

3 Emg

Magnetic Metals unlike all other Metals, Combine iron with Bismuth, Energize the Combination in various ways & see if get a ray or X

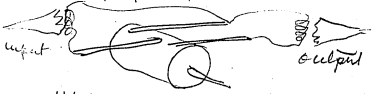


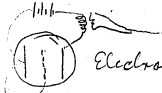




Bring to high temp & then let phone hang still higher at point where most acoustic to light also where Res of film comes down most,

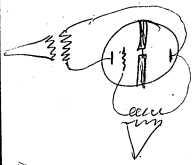
amplifying by Emq



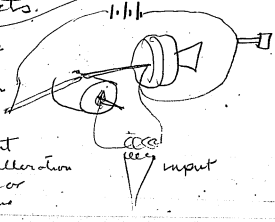


Electrolytes

Osmotic Decaplin



Bell Magnetophone or
Liquid in granule box
Microfone with 2 or 3
stage audion for heart
beats.



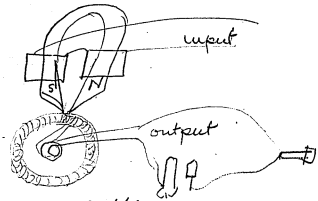
Reiger fast
spark
photomagnetism
in Bismuth
track
Ideas to that
surface alteration
permanently for
short time

Test sensitiveness of Emq
by heat & cold,

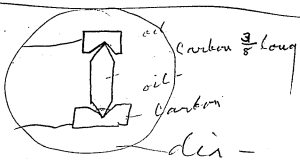
Secret wireless, using
Very high rate Vibs & detecting
by Emq which has no lag
or inductance -

Prism cut from all kinds
Crystals Carbonds, ammonia
iodide, & rare earths -

Long Thermo Couple, all kinds
metals, junctions & ends -
hit by X. Ray Cathode
ray Radium Etc. . -



Magnetic ~~rectifier~~ amplifier with Edison Valve in Ckt

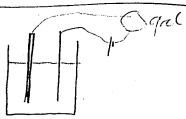


Set on Rubber sponge

Perhaps an acousticon with
gaudens around the balloon
using a disc like Amen Bell
with adjustable resonator
should get the natural
notes of the propeller
blades & amplify by
Eng or Audion

Use Eng with Aluminum
Cylinder cut in Phosphoric Soda
& get film on thin
use as Eng Chalk

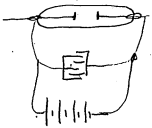
Try a Magnesium metal
Cylinder. — Dry oxidize the
surface & use KCH for
Emg. This should work



with & without battery — Liquids
Crystalizing
also interrupter of current &
cadion — Zinc & Ni &
other Metals as poles,

bare wire solid non condu melted
+ Cast around wire see if a
Kick in Anchor, or gold

Vac Tube



This should oscillate if vac
right shape, or Condor adjusted

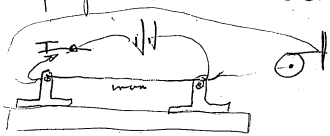
Lead Battery

Non shrinking pelets

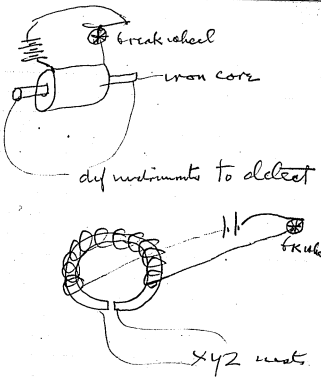
P – Silica hydrox + lead salt
Ba Sulfate,

Also Ba Sulfate pressed then
impregnated with lead by
precipitation, then Reduced to
Metal,

Burnt very porous clay
impregnated with Lead salt



go higher in heating wire
than fusk point & let it
cool & see if heat anything
at fusk point – also spool
wire around it



Try magnet on phosphorescent
dessing

A detecting instrument
Use phosphorescent disc
Then turn a slit like a
spectroscope let def rays
pass thru & see if accelerates
dying out at slit image -

Should use silk diaphrms
20 mesh & secures various
phos & fluoresc crystals on
for tests -

Could make slag wool
of melted MgO ZrO etc
by Electric arc which
would be useful for
something.

Fused Li Tungstate should be better fluorescer for X ray than Calcium Tungstate

---

Another detecting instrument Spark coil with points on verge of sparking – ray strikes point & spark passes

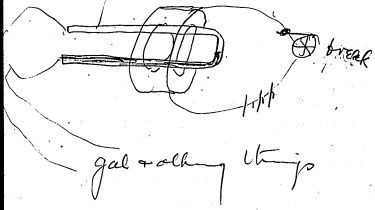
---

Pass a loop of two metals like a thermo thru a strong Magnetic gap & use various instruments to note any phenomena other than Elec

Observer with Microscope

built like a Thermometer
only larger filled different
liquid — pass rays
Coils around

Thermo wire + another metal



Perhaps with certain Crystals after subjection to def kinds of Energy which do not give light) may give other rays

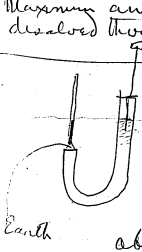
Make W Mo Cr U + other metal Crystals by fusion the same as my I made Tungstate Ca alloy with traces of impurities Lead Mn Bi Etc

some of these subjected to def rays when laid on photo plate interposing black paper may give image of all genera Cracks of metal _

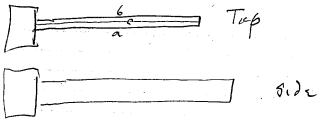
Suppose had 2 gratings one fixed the other could be vibrated with a beam of light on both the one that vibrated could be made to interfere & dull the light without moving .000001 of inch or one beam on Thermo & use galvanom

Crystalize fluorescing & phosc crystals under powerful Electric Stresses & see if it increases solubility - steady or alternating -

On best or those cylinders of Emg equal to 30 lbs strontia carb -
Wet with KOH, having maximum amount of colloids dissolved therein also other salts.



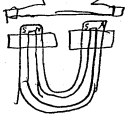
observe with telescope or micro



a is mica b mica & c mica forming a cell — put dif liquids in one side from the other different absorption of light on 2 sides heats & bends Cell — like a thermostat strip

Could connect end to Microfone tube audion or to a Mirror

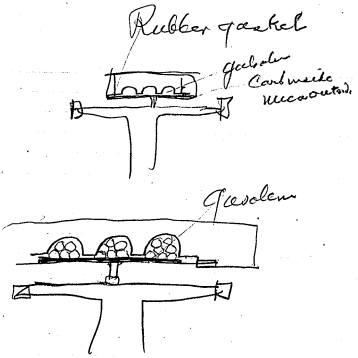
Rig up a small magnet with battery & key & bring poles close to audion bulb to deflection Cathode rays — & see if it alters the volume of a constant note being amplified by the audion



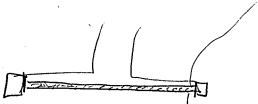
Two steel mags arranged to be a closed magnetic ckt — & used as a Receiving phone — already oriented & then work magnetic amplifier power

~~Discharge~~

Get large Crystals Clamp
one axis in steel Vise
Armor the 2 poles &
draw Violin bow over to
Vibrate see what form
Energy proceeds, also if
phos in dark or photo
by rays passing thru
Crystal which Vibrating



Acousticon with gasoline



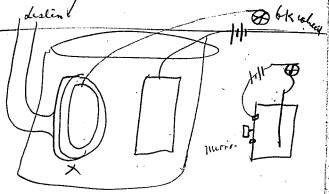
2 dia-
1/32 apart

Earth

filled full of very electrical
Excitable Oxalate of Calcium
or other Easily Excitable
powders -)

Determine by photog by
diff distances, X ray
fluorescence & % of
Resistance

In some of the best Emg
Cylinders make fresh &
add 5% Silicate Soda -



Plating Solution, see if can
hear the whirs of metallic
ions strike diaphm X

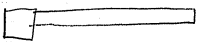
also use Micro connected
to diaphm & Audion -
Try plating Copper 1st
Try both Anode & Cathode

Mixture of melted Shellac + tetrachloronaphthalene when first poured becomes solid & semi transparent after being cold for several hours it turns yellow + entirely changes its nature. The tetrach crystalizes out notwithstanding the shellac is solid cold or brittle as well as strong. Dinitrobenzol & also Naphthalene does same thing. Energy must be given off in what form?

Make some precipitated sulfides that will not oxidize & make Emg Cylinders Telemeters, Grammeters,

Fred Ott make split (2) pieces faces with Palladium 1/32 width face each for Emg

Quartz



foil each side, bow it it should
bend and waves Try other
Crystals

With chemical papers recording
Can make it accumulative by
very slow moving of recording
Cylinder & connecting very
slow sending

Also sendinto a very small
Storage bat + deriv them thru
Valve mounted say 300 Gallin
& Commutating to heat

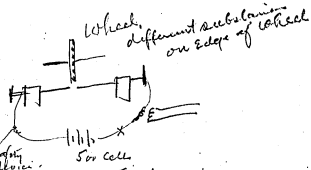
Smoke coming from a
dish insulated & Electrifying
P + N see if alter
Filling of the smoke for
Rain

Take a freshly loaded Nickel
bat time put in Ni Nitr Sulfate
very low density plates at
24 hours wash thoroughly
& put in test cell for detect

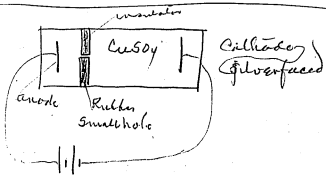
Best wireless phone detect
$\frac{1}{100}$ millionth of an ampere

A Pos or Neg electrified rod
of Rubber, glass etc
brought near an Audion
& made shown vary the volume
of a note being amplified—

Hold X ray or Radium over
pen of Eng & move it see if
it affects Volume of sound coming
in Note



See if hear in telephone, think a vibrator should be put in at X



See where + shape of deposit stunts.

to take care static in line
use Carborundum across line,
to discharge static or reverse waves
without blowing direct waves
= set up an artificial ckt Capy Imp

Sensitiveness of Best Head Phones

60	Vibs sec	620 millionths of a Volt
120	"	290
180	"	170
300	"	60
420	"	17
540	"	8
660		3
780		1
900		0.6

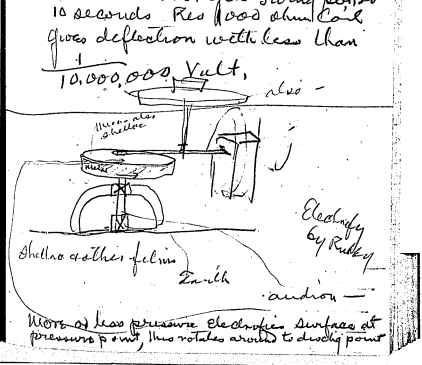
800 Vibs sec 1 millionth of a Volt

Limits Audibility of Telephone
diaphragm
amplitude is
6.3×10^{-10} CM
Encyclopd Brit under telephone

Enthoven $\frac{1}{100}$ of 200 gives deflection sufficient for observing with $\frac{1}{10\,000}$th of a Volt

Most sensitive Relay allow $\frac{1}{1000}$ of Volt if rapid $\frac{1}{200}$th Volt

Sensitive Mirror Galv swing period 10 seconds Res 1000 ohm Coil gives deflection with less than $\frac{1}{10,000,000}$ Volt,



Mass of less pressure electrifies surface at pressure point, thus rotates around to electric point

So far best cylinders for Emg
"Obmion"

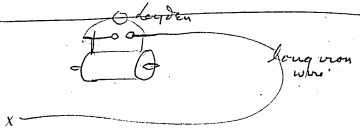
10 –

	on box	
$CaWO_3$	30	
Al hydrox	30	
Mg "	30 — flakes	
Zn "	26	
Ca ferrey	28	
Hed HgO	22	
Calcined MgO	26	
Mg Thorate	30 — smooth, small cracks	
Sr Oxalate	38 — Cracks shrinks	
Ca Arsenate	26 — Crumbles	
Ca Oxalate	32	
Ca Chromate	20	
Black Stannous Ox	28 @ 30 Cracks	
Sr Borate	28	
Al Chrom	24 Crax	
Cu Ox	32	
Ca Silicate	34 Enormous KOH works even in eccentric	
Sr Antimonate	20	
Sr Arsenate	20	
Ca Oxalate	500 at	26
Sr Carb	"	32
Sr Oxalate	750	32 goes [illegible]

Icebergs coming down to ground
temp aught to give sound on
Hydrophones by breaks formed by
Melting – These should be heard

If Bullet fired ahead should
hear it strike berg in fog
silence, if hear use Sealephone

Investigate Scintillations
further



see if get xyz at X 300 ft long wire

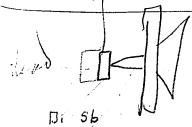
Fluorescence & heat is due to
strain in crystals. hence
electric, Magnetic heat &
sudden quench. Mechanical
vibration of crystals collisions
cannot now polar or fluorescence
sight by other rays or
Waves plus ultraviolet
after 12 hours in dead
dark room

Buy thin plates of fluorescing or phosphorescing material arranged so the ray passes thru many plates ~~[illegible]~~ Say first plate is of one material that phosphoresces or fluoresces to one part of the ray. The next plate should be of a different material which is sensitive to the ray passing thru the first plate then begins giving more light & so on with many plates each of a different kind until all of the rays are absorbed by this means the total light given off by the compound plates would be vastly increased

If light is used it can be reflected so the back of not the plates will give light desired to the observer

June 12th 1919

I wonder if 2 sources of Monochromatic light could be arranged to give beats & these beats arranged to give sub beats & so on thus bring the rate of vibration down to effect instruments. —



Di Sb

Audion, contacts pressed inwardly so as not to break out. using the elasticity of the diaphragm

1 a Bismuth field mag
+ high velocity cutting
wire would the Current
(if any) generated by the
opposite of that from an
iron field mag
Might give xyz instead of Elec

Alternating Current
passed thru Crystals
to press, would it give
light.

Try for chem paper
recording Leucoaniline —

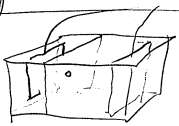
Bismuth rod in helix
powerful alternating
current – see if any
phenom. at end of rod
with Crystal & various
instruments – phos &
fluorescing Crystals,
or fluorescing stuff shewing
is diminished in brightness

Oxide Tin expands
11 times less than Sulphur
glass 8 times less than S
How about Selenium –
deposited Electrically
from Naselenite

Helix in front of slit of
Spectroscope helix powerfully
energized gives light,
Iron Obstacles & Interrupt
Wallace see if any effect on
lines, Coulombs & intermittent
Current
Also no helix but X ray
Radium etc stimulus

Don't forget the very long
iron wire magnet, also
the various sections 1"
iron bars wound to
make a very long magnet
It may have a time of
chg & dischg so as to
act as a resonator for
3@8 sec for propeller
of sub - capacity with capacity

Films of all kinds on glass that Conduct such as Arsenides Selenides Sulphides, Tellurides see how affected by all kinds of rays - *



005 hole in insulator partition

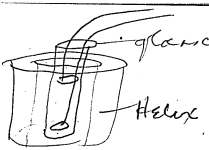
Cuprolumy Zns - Cathode

Silver etc / see if deflected

+ nature of + shape of

deposit if made dysymmetrical

by Light, heat etc

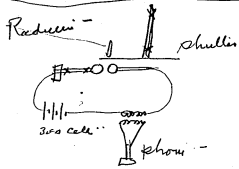


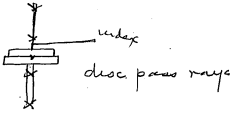
Cathode & anode -

Helix energizing by powerful
Alternating Current —
Def Liquids & poles -
Use X-Y-Z instruments Etc
One cell 4" long another
3 ft long

Get a Sensitive Pudwin
Electroscope —

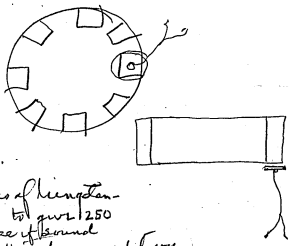
Be sure test Electrified Goods effect when heat near conductors —





Put 2 audions bucking
Each other so no current
pass thru then try X, Y, Z

Put crystals in non soluble
liquids, subject liquid to
strong sound waves
or elec stress like Condenser



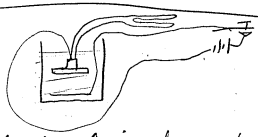
Chunks of tungsten-
Wheeler to give 1250
see to see if burned
due to alluminum gravel [illegible]
sheet from [illegible] - use Bell [illegible] + 3 audions
also

Insulating organic liquid –

water, with or without salts, 500 cells.

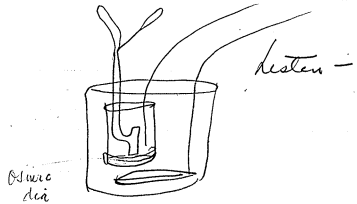
use high Voltage DC, & AC —

See if Can be made to diffuse into each other, might used one colored, also dilute with AC —



Osmotic diaphram – dialentor

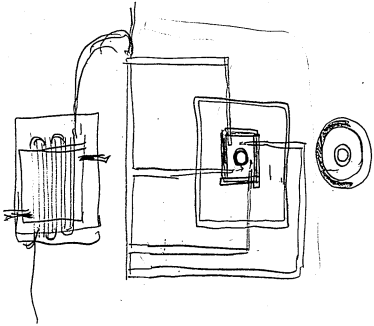
Pounds



When Emg ok. put in Tandem for amplification, + patent also with Edison Valve to straighten Current of course

Aluminum Electrode with film built up, transfer to water & see if it will act as a rectifier for weak Currents — Wireless also in Anhydrous Acetone Pyridine etc

In solutions of aluminate of soda ditto K
see if different metals can have Al_2O_3 films built on them.



$$30\overline{)240}^{\,8}$$

80

Notebook, N-06-04-27

This notebook was used during April 1908. All entries are by Edison. The book contains a log of storage battery cell tests. Some of the entries indicate the involvement of Walter E. Holland, George H. Hooper, Jr., and Charles Dally. Inserted into the book are 2 pages of cell test notes by Holland. The pages are unnumbered. Approximately 100 pages have been used.

Bismuth

	Number	Cold	25	50	100	150	200	250
By special labor reg— 708 green 7 gen[illegible]ed flake— Cons 18 hours in 18% H2SO4 – soak 4 min — washed quick Boil 10 H 21 K 638	7619	1000		1033	1040	1017	963	963
	7620	1027		1057	923	1017	953	953
	7621	1007		1023	990	983	960	953
		1011		1028		1006		
Dup on 10H. 708 637	7622	1097		1267	1297	1253	1083	
	7623	1107		1270	1260	1170	960	
	7624	1117		1267	1283	1240	1083	
		1107		1268		1221		
Dup 7619 Except green soaked 1 hour not washed—dried—boil 10 H 21 K 708 616	7625	980		1023	930	983	890	907
	7626	980		927	917	873	810	793
	7627	970		957	980	1000	900	927
		977				952		
Dup of 7625 10H 708 –	7628	1067		1170	1140	1280	1030	
	7629	1063		1227	1210	1277	990	
	7630	1067		1217	1267	1253	977	
		1065		1205		*1270		

7628 group ordered run continued on for Friday April 2nd 1908 –

	1 V	½ V
9 liters on hand	920	1283
	927	1270
	1000	1263

* Changed irons here as cap was much lower get the capacity from Hooper. only run 2 runs Cold then put back old irons which are in 200th.

180 + 181 had new Fe only

	1 V	½ V
181 Run	1290	1457
	1283	1400
	1267	1360

This shows trouble w/ Fe.

		Cold	50	100	150	200	200½ Hot.	
Now Square flake ½ thickness, ex reduced Aluminum Hydrogen								
1½ Spiral Reg. ½ oxf 3.9 24 – Conc Bi hydroxy in Mthy Al 2 min soak – washed 1½ crats, 2 or 3 times dried – Coated 5% K washed free K. 6 oz 21% K 708	8024 8025 8026	907 860 857 875	933 893 883	970 923 903	970 913 900 928	957 900 867		OUT
Dup 8024 21K 2 Lift 708	8027 8028 8029	970 987 1007 988	1233 1283 1300 1272	1177 1210 1283	1113 1170 1080 1121			
Dup 8024 green soaked same solution, but only washed five quick washes – dried – Coat 10%. 3.9	8030 8031 8032	883 893 907	893 887 937	890 893 923	[illegible]			
Dup 8030 Lift –	8033 8034 8035	1017 1017 1017 1017	1290 1263 1283 1279	1257 1283 1287	1310 1207 1291 1247 1307 1207 1320	1117 1117 980 1071	1233 1300 1323 1281	

	250	250 $\frac{1}{2}$ that		
8024	827	1010	347	
8025	797	974	334	
8026	743	910	310	

6

708 Same solution Bio[illegible], in NH_4OH as used in 7619 but 1/2 strength 4.5f 23.7 21K 2 ∠10H.	8039
	8040
	8041
Dup 8039 Bio[illegible] 1/4 strength 708 21K 2 ∠10H.	8045
	8046
	8047
4f Conc Bio[illegible] NH_4OH 708 — soaked 5 min in conc. boiled KOH, after drying - washed free KOH. 21K 2 ∠10H. 6.33	8078
	8079
	8080
Dup 8078 708 soaked 708 10 min — 4.3f 21K 2 ∠10H.	8084
	8085
	8086
Dup 8078 but soaked 20 mins 21K 2 ∠10H 708	8090
	8091
	8092

Cold	50	100	150	200	260½	Hot
1030	1200	1133	1157	1130		
1000	1200	1173	1183	1183		
1037	1237	1160	1180	1213		
1022	1212	1155	1172	1175		
1137	1253	1163	1113			
1163	1177	1040	997			
1127	1203	1123	1047			
11.42	12.11	11.09	10.52			
1137	1303	1427	1247	1177		
1080	1267	1377	1213	1180		
1130	1333	1407	1233	1200		
	1301	1409	1231	1186		
1230	1470	1437	1343			
1227	1460	1420	1313			
1220	1413	1400	1263			
12.26	14.48	14.19	13.03			
1090	1333	1347				
1100	1357	1297	not running on bo and in test solution			
1080	1340	1307	get no [illegible]			

		Cold	50	100	150	200	200½	Hot
Dup 8078 8 sept soak 131 Sol 10 min rinse wash - dried - soak again 2 min - rinse wash - then boil KOH. 708 21K 2 LiOH	8096 8097 8098	1087 1087 1066	1097 1273 1263	1310 1267 1267	1230 1210 1210	1130 1193 1180		
708 Dup Tubes 1-4 - Soak 2% KOH glycerol 131 Sol 10 min rinse wash - dried - formaldehyde, KOH washed - dried not black after oxyd 21K 2 LiOH.	8104 8105 8106	1123 1103 1067	1247 1227 1227	1287 1300 1327	1170 1173 1200	1067 1053 1163		
Dup 8109 but quick wash - grey after dry - 21K 2 LiOH.	8110 8111 8112	1117 1077 1077 1090	1260 1247 1247 1251	1360 1330 1333 1341	1133 1210 1230 1191	1000 1127 1120 1052	1403 1480 1503 1462	810 850 1000 957
E No 1 = 8 sept ½ Conc Birch, Nitly off - soak 10 min rinse wash - dried - formaldehyde, washed dried, not black only reduced a little way 21K 2 LiOH.	8116 8117 8118	1123 1073 1120 1105	1410 1410 1437 1419	1390 1370 1320 1360	1333 1347 1267 1316	1220 1243 1263 1242	1380 1383 1323 1362	967 893 1010 953
Regular 4-3 sept green commercial 8030 708 - but further treated formaldehyde 21K 2 LiOH.	8100	1093	1253	1283	1170	1113		
E No 2 - soaked glycerol commercial KOH - 10 min rinse wash - dried, formaldehyde in KOH, washed not black only partially oxyd 21K 2 LiOH.	8104 8105 8106	1123 1103 1067	1247 1227 1227	1287 1300 1327	1170 1173 1200	1067 1033 1163	1400 1397 1460	897 807 967
1055 E quicker wash here gave grey black on 8101 - glycerol 2% KOH - washed formaldehyde - grey - black dry 21K 2 LiOH	8110 8111 8112	1117 1077 1077	1260 1247 1247	1100 1107 1130	1050 1110 1123	1100 1127 1120		

Solvent to dry wood in the acetone formaldehyde - glycerol - KOH
N. Baker 7 Feb 1907

No 2 a Dup 8116 Except quick wash, formaldehy full strength - 21 KOH. dried all night oxygen Tempron again -

21K2 60H.

No 3 E Dup 8122 Except washed 3 times quickly - formaldehy very little KOH. went acid 3 times had add K - unwashed free of K dried all night and Temp - Black good -

21K2 60H

E No 8 708 Conc Bicly 11 NaOH - soak 15 min - wash twice quick, throw in large quantity water hot, wash well - dried all night and Temp

21K 2 60H -

Dup 8133 Tube made collode against Conc 4 hours - then run 50C

21K 2 60H -

Edward No 1 N f Conc Bicly NaOH soaked 10 min no wash dried - formaldehy weighted - dried - not black

21K2 60H

	8122							
	8123							
	8124							
	8128							
	8129							
	8130							
	8133							
	8134							
	8135							
	8136							
	8116							
	8117							
	8118							

Cold	50	100	150	200	200½	Hot	
1190	1393	1353	1270	1250		1020	
1193	1377	1323	1290	1160		1000	
1210	1437	1393	1370	1210		987	
1198	1402		1310			1002	
1133	1400	1333	1303	1193	1384	750	
1120	1410	1333	1330	1187	1333	1010	
1080	1307	1233	1213	1150	1373	713	
1111	1339		1282	1177	1364	924	
1173	1307	1347	1287	1193	1260	903	
1190	1327	1333	1250	1260	1330	1017	
1181	1317		1268	1226	1345	960	
1150	1363	1293	1200	997	1157	817	
1150	1297	1313	1180	1078	1180	880	
1150	1330	1303	1190	1023	1169	799	
1123	1410	1390	1333	1220	1380	967	
1073	1410	1370	1347	1243	1383	893	
1120	1437	1320	1267	1263	1323	1010	
1105	1419	1360	1316	1242	1362	957	

		Cold	50	100	150	200	200½		
Reg tubes flake ½ oz cut by hand 708 soaked 10 min Cone Bicly Alkyl — 2 quick washes rinsed on hot plate by Hypophosphorus Na wash free soak Alkyl	8146	1007	1377	1243	1067	893	1040	697	Set with Fin Hooks
	8147	1013	1393	1317	1157	953	1073	860	
	8148	1013	1393	1350	1217	947	1137	893	
ZIK 2 Lioth.		1011	1388		1147	941			
Ed 209 — [illegible] 39 sq f ½ 239 —	8157	1073	1267	1263	1303	1283	1500	610	
	8158	1047	1247	1250	1267	1223	1357	770	
	8159	1050	1237	1210	1177	1140	1210	747	
708 ZIK 2 Lioth.		1057	1250		1249	1215			
E 11 — Soak 55 min Cone Bicly Alkyl — 1 quick wash then plenty water several times, strained out & dried all night.	8169	1137	1243	1317	1250	1223	1363	1017	
	8170	1139	1307	1313	1263	1310	1430	1080	
	8171	1130	1237	1247	1163	1117	1277	943	
708		1135	1282		1235				
E 24 719 2 hours drain in barge — Cone Bicly Alkyl 10 min wash dried — heated 2 hrs then boiled 5% KOH wash neutralized & sq f ½ 24 grain	8334	1150	1383	1340	917 1493	843		719	
	8335	1160	1390	1417	1193 1449	673			
	8336	1107	1390	1417	1460 1430	793			
ZIK 2 Lioth.			1384						
2334 grain before — 843 673 793 — 150 min									

		Cold	50	100	150	150½	Hot	
E 25 Same as 8 24 Except washed twice quickly with Conc NH4OH—dried, then KOH. hot—washed 4.2 ½ sp f 239 719 21K 2 hOH 7.20	8340	1200	1447	1423	1280	1497	1090	
	8341	1260	1447	1457	1357	1557	1120	
	8342	1267	1447	1430	1280	1427	1123	
		1242	1447	1487	1306	1494		
E 25 ½ strength Conc HCl & HNO3 708 manipulated same as E 27 4.2 sp ½ 24— 21K 2 hOH	8346	1110	1407	1343	1307	1447	973	
	8347	1107	1410	1350	1240	1467	1040	
	8348	1077	1397	1243	1190	1467	960	
		1098	1405	1312	1246	1460	991	
E 29 719 2 h 10 min soak ½ strength Conc HCl & HNO3 2 sp ½ 24 hrs 2 washes Conc NH4OH—dried, then all night 10% KOH—in warm bath—washed heavy precip OH—dried, float yellow.. 21K 2 hOH	8352	1163	1460	1383	1320	1527	1030	
	8353	1143	1447	1230	1263	1467	600	
	8354	1170	1443	1297	1133	1550	1047	
		1159	1450	1303	1239	1515	942	
E 27 719 2 hrs soak ½ strength Conc HCl & HNO3 soaked 30 min, dried, boil 10% KOH—washed out K float yellow 4 ½ f sp 24— 21K 2 hOH.	8358	1143	1333	1340	967	1366	830	8358 only Bottle water Bottle taken in H— Interpolating 2 Reg Pt gets 50 Hot Lamp
	8359	1147	1350	1217	867	1433	923	
	8360	1170	1383	1367	1020	1443	773	
		1153	1355	1308	951	1412	942	

			Cold	50	100	150	150½	Hot
E 30 Dup E 29 but 708 boiled 100° first not yellow	8370		1063	1350				
	8371		1077	1387				
	8372		1033	1320				
21K 2 hoff			1058	1352				
E 33 Tube soak Conc HCl 10 min dried put in 21K 15 min (then boiled in 5% K	8379		1083	1383	1187	990	1317	637
	8380		1010	1300	1200	1090	1327	687
See colour green	8381		1023	1323	1143	1067	1333	607
21K 2 hoff			1029	1335	1177	1049		
Dup E 319 not heated soaked 10 min heated 5 min 140 take much metal deposited. see colour green	8382		1130	1380	1110 1150	880	1127	673
	8383		1057	1330	1157 1360	953	1133	713
	8384		1093	1355	1153			
21K 2 hoff								
Rod tubes 4.4 ½ gr 24.4 7/19	8457		1177	977	1163 1190			
3 or 4 grams Potassium hydroxide in Electrolyte	8458		1173	1267	1127 1310			
	8459		1173	1180	1167 1320			
21K 2 hoff.			1174	1141	1157			
8032 soak in Hot Conc 943 940 947								

Remarks (continued, on back page)

agreed by Hooper & Young — 1300 mv agreed Gen Conn —

other 58 not 142 additional Rem Cold — 1263, 1260, 1190, 1238 — get ½ V.

8370
8371
8372

delta 150 total remarks — 1214

			Cold	50	100	150	150½	Hot	
721 RA. filter press ½ w filtered dried low heat washed decomposition washed to min Con BiCl3 NH4Cl Leached Time Conc HCl ½ cf-dried half 10% KOH. Washed— 4.4 sp ½ f 21K 2 LiOH.	8568		863	1280	1093	903	1189	971	About 27 but need more in order to know with need long tube
	8569		867	1287	1133	1033	1147	970	
	8570		867	1243	1107	963	1173	920	
Dup 8568 2½% KOH 2 LiOH.	8571		767	1150	817	673	723	667	
	8572		763	1183	1170	640	723	693	
	8573		753	1183	797	677	843	740.	
858 719-2h- Soak 16 hours ½ strength BiCl3 NH4Cl washed 3 of 4 times—dried—leached KOH 2½% for 3 hours then 10% KOH half. washed 4.4 ½ sp f 21K 2 LiOH.	8687		1060	1303	1260				
	8688		1073	1287	1210				
8.17 719-2h- Soak 1½ hour Conc BiCl3 in Conc 4.17. 7.4.1 7583 Make and treated 21K 2 LiOH-	8791		1067	1400	1323				
	8792		1060	1387	1400				
857- SiCl2-KSCy green washed 4 hours BiCl3 NH4Cl dried then KOH 21% 2 hours then 10% KOH Boil. 21K 2 LiOH.	8683		1033	1300	1237				
	8684		1013	1267	1270				
858 719-2h- Soak 16 hours ½ strength BiCl3 NH4Cl then washed 3 or 4 times—dried—soaked KOH 21% 3 hours then quit— 10% KOH. boiled washed 4.4 f 21K	8685		1017	1050	1000				
	8686		997	1060	1030				
Dup 8685 21K 2 LiOH.	8687		1060	1303	1260				
	8688		1073	1287	1210				

		Cold	25	50	100	100½	Hot
E 78 – 719 2h – ½ strength BiOH Acetone as used in E 77 – worked same 4.3 f acid treated 24.2 not clear 21K ½ LiOH. 7400	8793	1197	1300	1290	1333	1463	937
	8794	1190	1317	1263	1327	1453	903
		1198	1308	1276	1330	1458	920
E 79 – more CP BiOH Acetone No Ha manipulation same as 77 4.3 23.8 acid f not filt. 719 21K see filtrate 7535	8795	1206	1397	1333	1327	1413	1043
	8796	1177	1350	1273	1300	1427	887
		1189	1373	1303			
719, 2 4.2 acid f not filt 2½ gram Dup BiOH in Electrolyte not boiled 21K 2 LiOH.	8797	1167	1367	1330			
	8798	1147	1310	1183			
		1157	1339	1256			
Dup 8797 1 gram BiOH in Electrolyte 21K 2 LiOH.	8799	1137	1297	1220			
	8800	1153	1347	1320			
		1145	1322	1270			
Dup 8797 400 mlg BiOH. 21K 2 LiOH.	8801	1123	1357	1303			
	8802	1117	1307	1283			
		1120	1332	1293			
Dup 8797 200 mlg BiOH. 21K 2 LiOH.	8803	1083	1260	1223			
	8804	1123	1333	1303			
		1103	1296	1263			

		25	50	100	100½	Half
719 2 h 4.3 ½ acid + not filt. 24.1 Jam: metallic Bismuth fastened to each tube 21K 2 hOH. 7702	8805	1176	1323	1320	1250	1490	570
	8806	1170	1303	1307	1293	1432	583
		1170	1313	1313	1271	1451	576
E 77 4.2 f heavy 24.1 – Sonkith Bich Acetate 719-2 h. RUN COLD 21K 2 hOH. 7508	8807	1040	1323	1417	1417	1440	790
	8808	1047	1307	1400	1397	1417	760
		1043	1315	1408	1410	1428	775
E 78 4.3 not f not filt. 24.2 Duff 3-73 – RUN COLD 21K 2 hOH	8809	1190	1237	1300	1333	1397	807
	8810	1150	1230	1280	1313	1363	783
		1170	1233	1290	1322	1380	795
E 80 719-2 Same ½ strength Bich Acetate not free of Fe treated with acetony heated in KOH after dropping treated 21K 2 hOH. 7580	8817	1177	1330	1313			
	8818	1153	1300	1290			
		1165	1315	1302			
719 2 h 4.2 f acid + not filt Tube. Loaded then soaked Bich Acetate free of Fe – dried – boil KOH in ab free 21K 2 hOH. 6467	8822	1143	1470	1470	1400	1587	767
	8823	1143	1490	1433	1333	1407	770
		1143	1480	1451	1366	1597	769
719-2 6 h f. acid not filt. after Tube opd & soak Bich Acetate free Fe 21K 6.4	8819	1157	1287	1243	1237	1247	393
	8820	1127	1270	1243	1227	1277	333
		1142	1279	1243	1232	1262	363

		Cold	25	50	100	100½	Hot
E 31 which is E 47 having a bubble Hg O precip on its porce. 4.2 faint not flat 23.5	8833	1047	1320	1293	1243	1327	640
	8834	1103	1343	1333	1217	1427	867
21K 2 Lioth. 7532		1075	1331	1313			
E 100 – 7/19 2 h Loaded in Tubes soak in Cone Bicly Acetin CP – ~~[illegible]~~ with Bicly treated Acetin – dried 12 hours top of each one plate then KOH – 4.2 f cm	8867	1216	1257	1227	1260	1270	240
	8868	1160	1227	1210	1227	1247	207
	8869	1207	1263	1230	1257	1267	233
21K 7745		1192	1249	1222	1248		
7/19 2 h soaked Cone Bicly Acetin freeze fr (not CP acetin) dried then KOH. 4.2 24 RUNCOLL 7672	8870	1123	1267	1327	1370	1433	923
	8871	1133	1270	1323	1367	1443	987
	8872	1133	1283	1360	1417	1480	1013
		1129	1273	1337	1395	1452	958
Dup 8870 20% KOH 2 Lioth.	8873	1217	1270	1367	1377	1523	1097
	8874	1223	1273	1377	1367	1513	1110
		1220	1271	1372	1372	1518	1103
E 98 7/19 2 h Soak Cone Bicly Acetin XCP dried and temp. then soak KOH all night heat in morning 4.3 24.1 2 Lioth. 7688	8877	1140	1333	1357	1283	1447	1037
	8878	1157	1353	1357	1293	1500	1057
		1148	1343	1357	1288	1473	1047
Dup 8877 27% KOH 2 Lioth.	8879	1257	1410	1320			
	8880	1257	1350	1300			
		1257	1380	1310			

			50	100	100½	Hot	
719 - tubes wine nut CP nickel Tubes loaded then soaked CP Bi Cl solution 4.3 24.1 fr end tests -	9019 9020	1120 1110 1115	1230 1230 1230	1240 1243 1241	1167 1200 1163	1187 1220 1203	233 300 316
21K							
Dup 9019	9023 9024	1160 1177 1168	1240 1217 1228	1267 1283 1275			
21K 2 ¼ OH.							
Bi hydroxy alone under gases - flake wood	9053	77	120	127			
21K							
E 108 - 719 - 2 hr Cone $Bi(NO_3)$ very acid, alcohol, fumes ... 33% KOH wood fuses 4.4 23.9	9112 9113	927 997 962	1210 1227 1218	1267 1273 1270	1233 1227 1230	1390 1393 1391	1083 1060 1071
21K 2 ¼ OH. 7375							
E 109 - 719 2 hr soak ½ hours Cone $Bi(NO_3)$ in solution, 50% KOH no heat 4.2 2.3.8	9116 9117	1157 1157 1157	1313 1300 1306	1320 1350 1335	[illegible] [illegible]	1497 1467	980 967
21K 2 ¼ OH. 7585							

		Cold	25	50	100	150½	Hot
E 110 - 719-2 h - Conc HNO_3 - Acetone ½ hour then without drying put in 21%	9120	1077	1237	1277	[illegible]	1393	867
went finer - 4.4 2.39 G.28	9121	1113	1223	1297	[illegible]	1393	797
21K 2 LiOH.		1095	1230	1267			
Tubes 719 2h 4½ freq acid treated 4 times - Tubes soaked PbO_2 Acetone KOH from distilling with $ZnCl_2$ - washed Acetone dried and Setup then 21½ warm freq ½ former then heated nickel hours & finally heated 10% K then washed till Little KOH left	9133	1133	1233	1250 1320	1267	1313	530
	9134	1133	1233	1237 1279	1233	1290	570
	9135	1133	1247	1267 1310	1233	1333	593
21K 1 LiOH.		1133	1234				
Dup 9133 but 21K 2 LiOH.	9136	1133	[illegible]	1267			
	9137	1170	[illegible]	1330			
	9138	1163	[illegible]	1287			
Dup 9133 Except 6 Rings 21K 1 gm LiOH.	9142	1167	1267	1280 1317	1253	1317	593
	9143	1133	1240	1227 1279	1240	1307	580
	9144	1127	1220	1227 1279	1200	1307	513
Dup 9133 Except 6 Rings 21K 2 gms LiOH	9145	1190	X	1310 1320			
	9146	1193	X	1330 1370			
	9147	1200	X	1367 1410			

		Cold	95	50	100	100½	Hot
Dup 9133	9151	1198	1303	1327 1370	1310	1343	600
Except 8 Rings	9152	1187	1260	1250 1310	1253	1343	507
21K 1 Light	9153	1193	1287	1293 1397	1277	1357	567
Dup 9133	9154	1197	X	1333 1373			
Except 8 Rings	9155	1157		1290 1343			
21K 12 Light	9156	1187		1333 1373			

Sample on 20th run of new Brannith tubes
Run hot & Cold repeat 3rd run - These tubes
[illegible] more To bring them up

L 104

	Hot	1st Cold	2nd	3 volt	Total
8078	1093	560	640	730 —	1423
8079	1087	680	750	837 —	1467
8080	1073	703	817	920 —	1467
8096	1013	613	683	770 —	1393
8097	963	717	827	913 —	1453
8098	1027	647	750	837 —	1380
8100	1033	566	667	743 —	1473
8104	897	593	617	760 —	1400
8105	807	497	567	627 —	1397
8106	967	517	693	807 —	1460
8110	810	460	563	630 —	1403
8111	850	580	673	767 —	1460
8117	1000	580	677	760 —	1503
8116	967	757	903	1010 —	1380
8117	893	777	920	1013 —	1383
8118	1010	980	1110	1170 —	1323
8122	1020	840	973	1067 —	1400 x
8123	1000	940	1073	1130 —	1343 x
8124	987	830	1043	1140 —	1333 x
8128	750	577	800	893 —	1387
8129	1010	640	807	933 —	1333
8130	997	497	683	810 —	1373

Prance a bad on Brannith caps thinnest low capacity to Volt but OK To 1/2 V - Strong we good hot Cap well fades on cold test

4	5	6	7	8

COLD

		Cold	50	100	150	200	250	250½ cold
Reg Imbro 107 A flake 7.1 flake 24.12 708 green Renovak.—	7473	1067	1193	1170	1190	1143	1083	1143
	7474	1067	1147	1143	1143	1097	1083	1147
	7475	1067	1143	1133	1140	1073	1043	1110
21K 2 Cold. 5.76								
21 Hardcore 005 ½ 3½ 237 108 Reg 21 flake Not original 7 flake - 24 - 708 green	7637	1063	1110	1117	1147	1110	1067	1150
	7638	1040	1097	1097	1110	1060	1060	1150
	7639	1060	1133	1150	1133	1113	1083	1160
21K 2 x Cold. 5.56								

Green soaked in solutions giving precipitates in pores

		Cold	50	100	150	200	200½	Hot	
Reg Tubes 1½ 3½ 2.27 ½ oz ft handout	8232	1237	1177	1200	1187	1153	1177	340	
708 – Carb Strontia precip in pores	8233	1223	1167	1197	1170	1153	1177	320	
E 17	8234	1227	1183	1193	1183	1170	1203	297	
21K		1229	1176	1197	1180				
Dup 8232	8235	1107	1223	1200	990	993	1163	587	
	8236	1117	1230	1213	997	967	1200	543	
21K 2 Lith	8237	1107	1197	1147	950	953	1120	558	
		1110	1217	1187	979	921	1161	531	
Dup 8232	8238	1210	1130	1170	1143	1117	1140	387	
E 16 Carb Barium precip in pores	8239	1197	1123	1147	1113	1083	1117	377	
	8240	1213	1143	1167	1143	1127	1153	368	
21K		1207	1132	1161	1133	1109	1137	376	
Dup 8238	8241	1086	1210	1147	1037	1000	1197	627	Sodium Nitrite
	8242	1060	1207	1140	1037	997	1179	630	
21K 2 Lith.	8243	1053	1200	1143	1040	1000	1193	633	
		1068	1206	1143	1038	999	1190	630	

		Cold	50	100	150	200	200½	Hot	
Dup 8235 E 15 – green soaked 140 cc 20 grams NaOH 6 hours 1 quench cornsoak divided – made into tubes. Then boiled KOH – dried after boiled & put right into 21K	8244	1140	1087	1130	1117	1083	1120	271	Co
	8245	1140	1087	1140	1130	1107	1133	300	
	8246	1147	1093	1123	1077	1063	1093	260	
		1142	1089	1131	1108				
21K									
Dup 8244	8247	1027	1233	1150	1013	833	Sev 1090	Interp 553	
	8248	1007	1197	1080	922	773	993	557	
	8249	1050	1233	1140	993	890	1113	567	
		1028	1221	1133	976				
21K 2 (10H)									
Reg Intra ½ ox sup – E 22 Sank Cone 710 Hydrolysis in NH4 NH4Cl dried then boil KOH, washed well	8295	1180	1120	1120	1077	1013	1040	250	Co
	8296	1180	1137	1167	1127	1087	1123	293	
	8297	1183	1153	1190	1163	1110	1147	263	
		1181	1137	1159	1122	1070			
21K 603									
Dup 8295	8298	1073	1367	1133	1053	973	1210	517	Co
	8299	1060	1350	1133	1017	967	1190	487	
	8300	1057	1347	1133	1110	953	1240	513	
		1063	1355	1133	1060	964	1200	506	
21K 2 (10H)									

		Cold	50	100	150	200	200½	Hot	
E 31 708 rather Conc BaCl 20 min Soak-Dried-soak Conc KSO4 2 hours washed then heated 5% KOH.	8361	1143	1093	1100	1095				
	8362	1150	1163	1117	1100				Co
	8363	1160	1093	1093	1083				
dishcast out 21K		1151	1099	1103	1093				
E 36 Double soak $BaCl_2$ – Na_2SO_4. 719 – 21K	8391	1167	1113	1123	1123				
	8392	1190	1137	1167	1177				Co
	8393	1180	1113	1113	1110				
		1179	1121	1134	1137				
Dup 8391 21K 2 ✓KOH.	8394	1063	1177	1173	1083				
	8395	1073	1187	1173	1083				Co
	8396	1077	1177	1173	1063				
		1071	1180	1173	1076				
E 37 $BaCl_2$ K_2SO_4 2 dips ½ f 4.5 24.1 719 21K	8403	1203	1163	1167	1143	1153	1173	487	
	8404	1217	1173	1167	1143	1126	1157	367	Co
	8405	1210	1160	1147	1120	1127	1163	357	
		1210	1165	1160	1135	1133	1164	404	
Dup 8403 21K 2 ✓KOH	8406	1113	1267	960					
	8407	1117	1217	1193					
	8408	1130	1257	1150					
		1120	1247	1101					

See ½.V outline

		Cold	50	100	150	200	200½	Hot
E44 $SrCl_2$ – K_2SO_4 1 soak	8439	1210	1240	1237	1220 1217	1177	1227	350
719 2 h – 4.4 f 23.8	8440	1207	1233	1243	1233 1229	1190	1227	353
21K ×2	8441	1217 1211	1240 1238	1223 1234	1233 1235	1217 1195	1240	357
Dup 8439	8442	1127	1330	1193	1033 1096	Hot 730 623		
	8443	1130	1333	1147	987 1050	643		
21K 2 ¼OH.	8444	1133	1367	1193	987	607		Note change
		Cold 25min		50min	100	150	150½	Hot
E49 = 708 $SrCl_2$ 2 hour soak	8645	1223	1177	1127	930	943	1000	2 TH 1273 Hydrogen Flash
dried then K_2SO_4 6 hours changed K_2SO_4 3 times 4.4 f 23.7	8646	1227	1170	1117	955	1023	1060	387
21K		1225	1173	1122	942	983	1031	390
Dup 8645	8647	1057	1300	1223	827	827	1000	667
	8648	1063	1310	1173	763	757	873	577
21K 2 ¼OH		1060	1305	1132	795	792	946	622

Cold for Brilliant

Cb

Cb

×2 See 8645 708 used or soaked 2 hours $SrCl_2$ 4 K SO_4 6 hours changed 3 times 100ml min 830 827 ¼OH 753 763

E 50 RAXXX – Soak 2 hours $SrCl_2$ dried – Soaked K_2SO_4 – changed 3 times 4.4 23.9 21K	8649 8650	
Dup 8649 21K 2 ∠10H.	8651 8652	
E 60 719 2 h – Soaked 2 hours Conc $SrCl_2$ dried, soak all night K_2SO_4 4.2 21K	8693 8694	
Dup 8693 21K 2 ∠10H.	8695 8696	
622 E 719 2 h – green used in 8645 put in $SrCl_2$ again 12 hours dried then in $MgSO_4$ 4.1 Mistake here 8645 has 708 21K	8737 8738	
Dup 8737 21K 2 ∠10H.	8739 8740	

See E 49 f to 708 or 719

Cold	25	50	100	150	150½	Hot.	
1273	1263	1223	1120	1067	1133	383	
1293	1280	1253	1213	1143	1217	367	
1283	1271	1238	1216	1159	1175	375	
1067	1220	1190	900	800	933	443	S m S 2R
1073	1247	1227	933	797	948	510	S 2R
1070	1233	1209	917				
1230	1203	1177	1147				
1220	1197	1140	1170 1087				
1225	1200	1155	1113				
1087	1203	1160					
1067	1203	1177					
1077	1203	1169					
1180	1157	1133	1143				
1177	1153	1140	1160 1143			Mistake here	
1178	1155	1136	1147 1143			see 622	
1030	1200	1173	1093	1000	1083	567	
1053	1200	1160	1057	993	1077	547	
1041	1200	1166	1075	996	1080	557	

E 75 Lot 49. in $Ni(OH)_2$ dissolved in NH_4Cl + NH_3 - soaked 12 hours - dried Coil 1504 4:1 Lot 49 in $SrSO_4$ - 21K	8749 8750
Dup 8749 21K 2 $NaOH$,	8751 8752
E 63 719 24 $MgSO_4$ 12 hours dried then $SrCl_2$ 12 hours evacuated 4:3 23:9 21K 7719	8753 8754
Dup 8753 21K 2 $NaOH$,	8755 8756
E 67 719 24 Na_2CO_3 12 hours dried then $CaCl_2$ 12 hours 4:1 21K 7151	8765 8766

* see about 49 & 708 or 719

CaO	25	50	100	150	150½	Hot	
1267 1273 1270	1233 1226	1197 1190 1193	1127 1140 1139				CO
1100 1127 1114	1267 1313 1290	1237 1283 1260	1023 1077 1100	950 867 909	1077 1023 1050	650 670 670	CO S-1 R
1190 1213 1202	1167 1160 1163	1133 1123 1128	1163 1147 1155	CO			
1117 1120 1118	1320 1287 1303	1240 1267 1253	1067 1063 1065	1007 990 999	1100 1093 1096		CO
1197 1173 1185	1110 1117 1113	1117 1110 1113	1167 1177 1167 1160 1167	1213 1223	1223 1227	263 330	

682. 719 2 h – soak 12 hours phos Na dried then 12 hours $BaCl_2$	8773
4.2 128AF ½ 23F 21K *1 7439	8774
Dup 8773	8775
	8776
21K 2 LiOH.	
E 69. 719-2 h – soak 12 hours $BaCl_2$ dried, then 12 hours in MgSO4 4.1 128AF 24.1	8777
	8778
21K	
Dup 8777	8779
	8780
21K 2 LiOH.	
E 71. 719-2 h – soak 12 hours Na phos. dried. then 12 hours $CaCl_2$	8781
4.1 24 – 128AF 21K	8782
Dup 8781	8783
	8784
21K 2 LiOH	
*1 see 8427 – E 38 orthophos + $BaCl_2$ ng –	

Cold	25	50	100	100½	Hot
1247	1170	1183	1250	1267	400
1240	1183	1187	1243	1255	370
1243	1176	1185	1240		365
1150	1300	1287	1170	1283	590
1133	1257	1267	1183	1263	547
1172	1275	1277	1170		560
1223	1183	1183	1220	1223	340
1193	1163	1163	1200	1220	337
1205	1173	1173	1210		339
1079	1237	1250	1210	1303	533
1107	1300	1303	1240	1323	487
1093	1268	1276	1225		510
1253	1200	1180	1190	1210	297
1243	1183	1173	1223	1247	293
1244	1191	1176	1217		295
1183	1273	1280	1180	1357	487
1117	1283	1273	1160	1436	473
1125	1278	1276	1170		481

	150	150 $\frac{c}{\Sigma}$	thou
8773	1247	1263	443
8774	1237	1243	413
8775	1103	1220	567
8776	1170	1220	567
8777	1223	1220	327
8778	1197	1223	317
8779	1133	1247	583
8780	1130	1253	600
8781	1143	1180	267
8782	1173	1183	290
8783	1103	1203	620
8784	1167	1250	603

		Cold	25	50	100	100½	Hot
872 719-2 h – Soak 12 hours $CaCl_2$ dried then 12 hours Pot Fluoride 6.27 4.1 ppm f 24 21K	8785 8786	1243 1233 1238	1243 1197 1220	1230 1193 1211	1240 1193 1223	1263 1217 1240	280 313 296
Dup 8785 21K 2 LiOH	8787 8788	1150 1163 1156	1347 1330 1338	1353 1353 1353	1230 1240 1235	1410 1390 1400	580 587 583
885 719-2 h – Soak Conc $HgCl_2$ 35 mins dried then soaked Conc Ammonia – then KOH – 4.2 fluorinated 23.7 21K 7460	8855 8856	1240 1223 1231	1240 1220 1230	1267 1243 1255	1257 1223 1240	1267 1247 1257	227 277 252
Dup 8855 21K 2 LiOH	8857 8858	1127 1110 1118	1300 1300 1300	1298 1283 1288	1237 1227 1232	1316 1307 1308	550 580 565
886 719-2 h – Soaked nearly Con Stannous Chl in Acetone 3½ hours then KOH, Bad action – 4.2 and f 23.7 21K 7435	8859 8860	1137 1127 1132	1153 1157 1155	1117 1133 1125	1130 1163 1146	1143 1193 1168	200 203 201
Dup 8859 21K 2 LiOH	8861 8862	1053 1090 1071	1167 1160 1163	1157 1150 1153	1143 1133 1138	1247 1200 1223	590 547 568

	150	50 $\frac{1}{2}$	+60
8785	1200	1217	313
8786	1183	1193	263
8787			
8788			

		Cold	25	50	100	100°/2	Hot	
E87 719 2 h soak Conc Cadmium Perchlorate 3½ hours Dried — then KOH. 4.2 239 21K 7530	8863	1243	1190	1173	1177	1197	247	Co
	8864	1250	1213	1200	1200	1213	247	
		1249	1201	1186	1189	1205	257	
Dup 8863	8865	1027	1183	1160	1167	1213	620	Co
	8866	1043	1183	1163	1163	1220	487	
21K 2 LiOH.		1035	1183	1162	1165	1216	553	
E 106 719 2 h soak Thorium Cl somewhat acid — then KOH — 4.2 242 21K 7405	8897	1080	1097	1093	1157	1147	230	Co
	8898	1093	1113	1090	1127	1133	227	
		1086	1105	1091	1142	1149	228	
Dup 8897	8899	1017	1160	1167	1147	1223	513	Co
	8900	1017	1177	1177	1147	1223	553	
21K 2 LiOH		1017	1169	1172	1147	1223	533	

		Cold	25	50	100	150	200	250	300
7107 – 21H 005 spiral – cut flute 10 grams	5530	1183		1165	1150	1172	1190	—	—
	5531	1157		1150	1137	1145	1163	1143	1130
	5532	1165		1137	1127	1137	1167	1127	1123
		1168		1151	1134	1151	1173	1135	1126
716RQ free cobalt by Hypo ½ w not filtered dried low heat	7868	1103		1097	1113	1093	1057 1103		
618 g ½ thick ox yellow	7869	1113		1110	1113	1090	1063 1113		
21R0H	7870	1113		1073	1103	1073	1047 1095		
		1109		1093	1110	1085	1076		
Dup 7868	7871	1070		1230	1110	943	960		
	7872	1063		1230	1107	980	960		
21R2L10H.	7873	1080		1247	1087	950	957		
		1074		1236	1101	958	959		
718RQ – CP Soda used for precipitg ½ wash – not filtered, dried low heat,	8172	1217		1177	1183	1193	1178 1207	not of 327	
4 g ½ oz green more bulky than 708	8173	1227		1193	1197	1217	1193 1217	297	
21K 6.09	8174	1200		1153	1173	1157	1150 1147	253	
		1205		1178	1151	1189	1172	292	
Dup 8172	8175	1147		1243	1187	1113	1047 1063		
	8176	1170		1267	1193	1083	1010 1220		
	8177	1143		1270	1193	1067	1000 1207		
21R2L10H –		1153		1260	1191	1088	1019		

		Cold	25	50	100	150	200	200 1/2	Hot
Reg Litho 39 1/2 oz of f 24.2	8178	1187	1	1153	1183	1193	1180	1200	263
green used in 6079	8179	1202		1167	1187	1217	1233	1260	347
RQ 710 1/2 wash filtered - low heat	8180	1170		1107	1097	1127	1117	1140	230
Mass action		1186		1172	1176	1179	1177	1200	280
21K 6.47									
Dup 8178	8181	1217		1303	1267	1260	1147	1350	470
	8182	1203		1287	1317	1223	1183	1323	503
	8183	1200		1300	1283	1200	1120	1303	533
21K 2 d10H -		1206		1297	1289	1207	1150	1325	501
Reg litho 1/2 oz f. square.	8184	1260		1170	1197	1200	1183	1191	253
Regular new plated rings	8185	1207		1200	1220	1223	1213	1230	217
707RQ - No wash - filtered dried low heat	8186	1167		1177	1190	1183	1197	1213	227
21K 6.22		1191		1182	1202	1202	1195	1213	232
Dup 8184	8187	1193		1267	1277	1130	1123	1263	440
	8188	1190		1313	1330	1180	1123	1343	470
	8189	1197		1300	1297	1133	1093	1277	497
21K 2 d10H.		1193		1293	1301	1148	1115	1294	469

2501 250½ flat

8181	1133	1247	633
8182	1110	1253	620
8183	1073	1230	627
8187	1047	1197	573
8188	1017	1257	587
8189	973	1176	633

		Cold	25	50	100	150	200	200 3/2	Hot
719RA 2 hours in filter bag 1/2 wash filtered, dried low heat. 1/2 ox sgp f. 24-	8301	1200		1087	1040	1090	1070	1113	250
	8302	1183		1053	1047	1077	1063	1090	273
	8303	1197		1037	967	997	1047	1063	280
21K 6.52		1193		1059	1018	1051	1060		264
Dup 8301	8304	1163		1317	1173	1097	1000	1527	513
	8305	1167		1333	1240	1163	1050	1271	557
	8306	1163		1323	1147	1090	977	1224	570
21 R 2 Loff		1164		1324	1187	1117	1009	1339	567
719. Drained 10 hours.	8313	1137		1043	1030	1063	1073	1087	247
	8314	1163		1047	1043	993	1033	1093	267
	8315	1147		1080	1110	1117	1143	1160	280
		1149		1057	1061	1054	1083	1093	265
Dup 8313	8316	1103		1277	1147	1083	1027	1213	507
	8317	1113		1250	1133	1087	1017	1290	507
L Off	8318	1100		1243	1133	1107	1010	1193	590
		1105		1257	1138	1092	1018	1189	551

			Cold	.25	50	100	150	150 ½	150 Hot	
Rec of lubr sgp f ½ or Zn H –	8505		1180	1170	1157	1183	1177	1197	253	
RQ 720 ½ wash, filtered, low heat	8506		1173	1160	1153	1187	1183	1200	267	
4.4 2.4.2	8507		1176	1165	1155	1185	1180	1197	260	
21K			1177	1165	1155	1155				
Dup 8505	8508		1173	1333	1350	1277	1067	1303	613	Hot 75° Between waves in the Water run
	8509		1187	1343	1373	1263	997	1303	593	
	8510		1180	1338	1362	1270	1032	1303	603	
21K2 ¼ oil.			1180	1338	1361	1270				
RQ 721 ½ w filtered, dried, low heat.	8514		1233	1213	1157	1117	1057	1097	258	5 ·5 on 5
filtered in Filter Press Looks like 708 + not	8515		1243	1227	1190	1177	1150	1197	273	5 5 on 5
like 707 – 4.4 f ½ sgp Zn H. Flake bitty	8516		1240	1213	1187	1193	1163	1193	250	
677			1239	1218	1178	1162	1123			
Dup 8514	8517		1200	1330	1343	990	1000	1267	487	
	8518		1180	1333	1373	1200	1067	1267	460	Co
	8519		1177	1317	1213	1030	973	997	393 15 S.I. Ring	
21K2 ¼ oil.			1186	1327	1309	1073	947	1160	449	

Dup of 721 also split on 100th run

		Cold	25	50	100	150	150½	Hot	
721 ½ w filtered-low heat. bag filter washed decantation ZnHf	8547	1260	1223	1190	1200	1210			
	8548	1273	1220	1193	1200	1187		6-mm	slightly spotted.
	8549	1267	1223	1213	1200	1197			
21R 6.47		1267	1222	1199	1200	1194			
Dup 8547	8550	1273	1340	1307	1333	977	1200	547	10.8-
	8551	1247	1333	1357	1267	1043	1293	573	
	8552	1240	1333	1383	1240	1130	1370	660	
21R 2 ½OH.		1257	1335	1335	1253	1090	1288	593	
721 ½ w filtered-dried low heat washed percolation 44 f ½ gr ZnH. fresh now filtered, ZIR 6.35	8553	1275	1217	1217	1193				
	8554	1290	1223	1173	1047		Co	5 on 5 orange	
	8555	1283	1200	1183	1200				
		1283	1213	1191	1147				
Dup 8553	8556	1213	1333	1397	1257	1067	1247	567	Hot [illegible]
	8557	1230	1347	1373	1300	1083	1287	560	
	8558	1223	1347	1373	1283	1053	1233	523	
21R 2 ½OH.		1222	1342	1314	1290	1068	1256	550	

		Cold	25	50	100	150	150½	Hot	
721 Same green as 8553 but washed by decantation its green like 707	8559	1123	1110	1053	1057				
4.4 ½ peacock ½ w-filtered dried knobbed	8560	1117	1093	1027	1013		C O		
Note low weight	8561	1123	1107	1053	1037				
21K .567		1121	1103	1044	1036				
Dup 8559	8562	1040	1160	1097	950	680	797	480	
	8563	1023	1137	1087	933	620	727	493	Co
	8564	1023	1167	1133	1033	690	800	520	
21K2 (10H).		1029	1150	1106	972	663	775	498	
1062RA. 721 with more water added	8580	1253	1220	1160	1133	1090	1127	367	
Washed percolation on 11th day	8581	1220	1177	1167	1180	1090	1143	313	
4.4 2.4H.	8582	1250	1207	1193	1197	1143	1170	353	Co
21K		1241	1201	1173	1170	1108	1147	344	
Dup 8583	8583		1290	1223	1033	883	1000		50-IR
	8584		1330	1313	1143	1023	1200	Co	
	8585		1283	1223	753	943	1160		
21K2 (10H).			1301	1253	1023	950	1120		

		Cold	25	50	100	150	150½	Hot	
1062 RQ – washed decantation	8586	1290	1243	1207	1210	1183	1210	363	
4.4 ½ 24.4	8587	1280	1240	1200	1227	1200	1227	333	
	8588	1290	1247	1207	1170	1110	1150	307	
21 K		1287	1243	1205	1202	1164	1196	324	
Dup 8586	8589	1183	1283	1240	1167	977	1160		Co
	8590	1193	1290	1243	1177	1000	1168		
	8591	1197	1303	1237	967	860	1000		SS LR
21 K 2 L.O.H.		1191	1292	1240	1172	946	1108		
1068 RQ Low heat, washed decantation	8595	1263	1210	1190	1183	1130	1157	323	Co
4.4 f 24	8596	1260	1200	1180	1180	1140	1143	310	
	8597	1260	1180	1167	1200	1167	1190	290	
21 K		1261	1197	1179	1187	1146	1170	308	
Dup 8595	8598	1167	1297	1230	1170	1027	1157	571	Co
	8599	1173	1287	1243	1157	1017	1157	570	
	8600	1173	1273	1240	1050	897	1020	550	
21 K 2 L.O.H.		1171	1266	1238	1126	980	1155	566	

		Cold	25	50	100	150	150½	Hot	
1068 - lowest Percolation	8601	1200	1117	1093	1100	1057	1063	300	
4.4 ½ 24.1	8602	1217	1120	1100	1087	1080	1097	207	Co
	8603	1223	1160	1130	1110	1077	1090	290	
21K		1213	1132	1108	1099	1071	1090	266	
Dup 8601	8604	1100	1267	1223	990	793	970	560	
	8605	1100	1250	1227	1110	890	1083	600	Co
	8606	1107	1260	1173	950	867	1027	507	
21K 2 L.O.H		1102	1259	1204	1017	850	1027	556	
721.RQ ½ w not filtered,	8619	1217	1113	1090	1073	1063	1077	287	
Percolation. low h	8620	1223	1130	1090	1123	1077	1090	213	Co
4.4 ½	8621	1227	1157	1147	1187	1133	1197	273	
21K		1222	1133	1109	1124	1091	1104	231	
Dup 8619	8622	1217	1327	1327	1153	857	977	553	
	8623	1190	1283	1285	1113	917	1040	537	Co
	8624	1217	1323	1310	1093	1010	157	270	
21K 2 L.O.H.		1204	1311	1307	1120	975	1025	557	

Spring Hunt

		Cold	25	50	100	150	150½	flat	
1064 RQ Dried bosch washed percolation 4.4 ½ of 2.4	8625	1257	1207	1190	1190	1160	1150	283	
	8626	1250	1207	1213	1240	1227	1247	227	Co
	8627	1250	1207	1163	1140	1093	1123	273	
21 K		1252	1207	1199	1190	1160	1183	241	
Drop 8625	8628	1220	1387	1363	1170	933	1110	607	
	8629	1220	1343	1363	1113	900	1060	540	Co
	8630	1227	1427	1350	1127	910	1067	483	
21 R 2 √10H,		1222	1386	1359	1127	914	1079	543	
1066 RQ bosch washed percolation 4.4 2.4	8631	1250	1197	1193	1213	1193	1217	260	
	8632	1253	1197	1177	1173	1150	1207	263	Co
	8633	1253	1210	1177	1190	1167	1190	263	
21 K		1252	1201	1182	1192	1170	1222	262	
Drop 8631	8634	1190	1323	1357	1157	933	1173	467	
	8635	1193	1303	1280	1060	990	1147	450	Co
	8636	1193	1383	1373	1050	883		463	
21 K 2 √10H		1192	1336	1337	1089	935	1160	460	

		Cold	25	50	100	150	150½	Hot	
1070Ra Washed & decantation. Dried. Low heat 4.3 ½ 23.9 21K 7563	8719 8720 8721	1260 1243 1263 1255	1177 1177 1183 1179	1167 1167 1187 1174	1210 1220 1250 1227	1160 1033 1173	1163 1163 1208		
Dup 8719. 21K 2d10H	8722 8723 8724	1210 1220 1196 1207	1323 1333 1400 1352	1330 1333 1346 1334	1073 1073 1053 1070	933 910 893 912	1050 1033 1013 1032	483 490 480 484	consistent Hollow
1070Ra low heat Percolation 4.2 23.9 green bottle 21K 7225	8713 8714 8715	1250 1240 1243 1244	1197 1197 1180 1191	1150 1190 1160 1167	1177 1190 1187 1151				
Dup 8713 21K 2d10H	8716 8717 8718	1153 1153 1153 1150	1303 1297 1250 1243	1193 1237 1237 1222	910 980 883 924				

		Cold 25	50	100	150	150½ Hot		
1072RA fresh Percolation 4.1 23.8 21K 7197	8725	1260	1196	1183	1180	1133	1140	297
	8726	1247	1187	1170	1173	1143	1157	273
	8727	1253	1193	1183	1160	1183	1170	270
		1253	1190	1179	1171			
Dup 8725	8728	1143	1333	1200	1083	800	907	493
	8729	1177	1333	1237	987	800	933	500
	8730	1160	1333	1243	1000	833	960	470
21K 2 1.0H		1160	1333	1227	1023	811	953	488
RA 723 filtered in lab with filter prev. dried fresh - percolation 4.2 f 21K 6.51	8918	1140	1167	1160	1157 [1174]			
	8919	1183	1191	1203	1227 [1237]			
		1161	1182	1181				
Dup 8918	8920	1170	1310	1330	1333 [1407]			
	8921	1163	1297	1330	1313 [1407]			
21K 2 1.0560.		1166	1303	1330	1323			
RA 723 1/2 w dried 2 hours filter Gauge - low heat Decantation according to Lewis then dried 68 strip and 707 4.3 f 24 21K 7335	8922	1123	1130	1103	1127 [1137]			
	8923	1123	1130	1127	1127 [1140]			
		1123	1130	1118				
Dup 8922	8924	1120	1230	1240				
	8925	1110	1230	1243				
21K 2 1.0N.		1115	1230	1241				
E 85 7.19 g h soaked Conc H Cl 35 mm dried then soaked Conc Ammonia - then KOH. 4.2 f acid treat. 23.7 - 21K 9460	8855	1240	1240	1267	1297 [1307]			
	8856	1223	1220	1243	1233 [1247]			
		1231	1230	1235	1295			
Dup 8855	8857	1127	1300	1293	1237 [1310]			
	8859	1110	1300	1283	1227 [1307]			
21K 2 1.0H.		1115	1300	1288	1232			

assisted Hallam

		Cold	25	50	100	100 ½	Hot
723 Ra ½ w drying 2 hours bags. low heat Percolation 4.2 24.1 21K 7320	9002	1183	1203	1197	1190	1200	190
	9003	1187	1197	1198	1207	1220	220
		1185	1198	1195	1198	1210	210
Dup 9002 21K 2 doH.	9004	1163	1327	1353	1317	1397	430
	9005	1163	1290	1327	1297	1370	433
		1163	1309	1340	1307	1393	431
723 ½ w Not filtered low heat. Decantation – 4.3 23.8 21K 7559	9006	1140	1107	1080	1100	1117	203
	9007	1183	1160	1147	1183	1193	217
		1161	1140	1164	1141	1155	213
Dup 9006 21K 2 doH.	9008	1140	1240	1237	1217	1277	417
	9009	1140	1267	1250	1217	1283	437
		1140	1253	1243	1217	1282	427
723 ½ w Not filtered low heat Percolation 6.34 4.2 24.1 21K 7476	9010	1207	1167	1137	1177	1193	203
	9011	1223	1187	1133	1197	1210	187
		1215	1177	1135	1187	1201	195
Dup 9010 21K 2 doH.	9012	1180	1327	1347	1360	1433	590
	9013	1170	1297	1307	1353	1430	530
		1175	1312	1333	1356	1431	563

SS
11

722 (groups) hq low cap – Entry variation is wrong) 8 To 900 only
+ doH heat improves Capacity

		Cold	25	50	100	100½	Hot
724 Ra Filtered prep, low heat — Decantation 4.3 239 ½ 21K 6839	9058 9059	1117 1133 1125	1100 1130 1115	1123 1157 1140	1140 1150 1145	1165 1127 1165	160 200 180
Dup 9058 21K 2 d. OH.	9060 9061	1073 1067 1070	1200 1233 1217	1237 1257 1247	1260 1267 1263	1313 1343 1328	487 510 499
724 Ra ½ w dilutnd filter Engo. low heat Percolation. 4.3 243 21K 6797	9062 9063	1117 1123 1120	1113 1100 1106	1113 1100 1106	1140 1150 1145	1160 1170 1165	193 153 173
Dup 9062 21K 2 d. OH.	9064 9065	1180 1073 1086	1227 1200 1213	1243 1247	1247 1153 1200	1267 1288	450 513
1080 B (Ra) Decantation — precip with very amount NaOH in cold ½ w filter precip dried very low heat, washed decant until cond water Column H.S.O.4 4.3 241.1 561 21K 6744	9082 9083	1093 1093 1093	1133 1127 1136	1147 1130 1155	1177 1127 1152	1200 1140 1170	233 200 216
Dup 9082 21K 2 d. OH.	9084 9085	1060 1060 1060	1173 1170 1171	1220 1223 1221	1223 1213 1218	1283 1310 1296	393 430 412
1080 B Percolation, otherwise same as 9082 21K 6691	9086 9087	1066 1087 1089	1083 1113 1098	1093 1110 1101	1093 1107 1100	1117 1127 1122	167 183 175
Dup 9086 21K 2 d. OH.	9088 9089	1040 1050 1045	1140 1170 1155	1190 1200 1195			

			Cold	25	50	100	100½	Hot
Ra 1080A low h-percolation with cold water 4.2 24 21K 7058	9090		1117	1127	1143	1130	1140	203
	9091		1117	1150	1160 (1142, 1173)	1157	1170	217
			1117	1140				
Dup 9090	9092		1087	1253	1317	1280	1377	407
	9093		1110	1227	1283	1250	1337	370
21K 2 ¼ OH.			1099	1240	1300			
Ra 1080 low h Recirculation Cold water – 4.4 24.2 21K 7052	9094		1083	1083	1110	1123	1137	130
	9095		1093	1143	1143	1176	1183	193
			1088	1113	1126			
Dup 9094	9096		990	1177	1200	1217	1267	480
	9097		993	1183	1207	1240	1263	470
21K 2 ¼ OH.			991	1180	1203	1229	1275	475
1081A – Percolation – bag filter – Na average by 129 amount NaOH ½ water then add 10% 1/13 OH Cold, ½ water, bag filter, bag filt percolation water dry before percolation 4.4 24.2 21K 7099	9102		1183	1157	1143	1187	1193	220
	9103		1187	1150	1140	1153	1167	220
			1185	1153	1141			
Dup 9102	9104		1110	1223	1297	1250	1320	480
	9105		1117	1217	1300	1250	1347	477
21K 2 ¼ OH.			1113	1220	1299	1250	1333	478
1081B a variation of 9102 difference is cool filter press 4.3 24.2 21K 6105 S	9106		980	1020	967	CO		
	9107		983	1023	987			
			981	1021	977			
Dup 9106	9108		913	1000	1000	907	1027	493 CO
	9109		880	993	1033	887	1000	517
21K 2 ¼ OH.			896	996	1017	897	1013	505

			25	50	100	100 ½	Hot
Ra 1084A. percolation 24.1 4.4	9157	1193		1223	1207	1220	193
	9158	1180		1197	1193	1210	173
	9159	1193		1227	1197	1207	190
21K 7131							
Dup 9157	9160	1097		1210	1183	1227	417
	9161	1090		1210	1217	1267	437
	9162	1130		1247	1207	1297	457
21K2-108H.							
Ra 1084B. Percolation 4.2 2.4.2	9163	1143		1173	1163	1190	173
	9164	1150		1187	1180	1203	173
	9165	1150		1187	1163	1190	227
21K 7075							
Dup 9163	9166	1050		1170	1173	1203	417
	9167	1067		1170	1193	1240	400
	9168	1067		1180	1193	1267	433
21K2-108L.							

		Cold	25	50	100	100½	Heat
RA 725A percolated 17 washes, dried in drier 48 hours before percolation otherwise same as 721	9169	1187		1213	1230	1247	177
	9170	1200		1233	1210	1230	227
	9171	1207		1220	1213	1203	197
4.4 21K 7354							
Dup 9169	9172	1170		1333	1333	1410	460
	9173	1177		1313	1327	1390	473
	9174	1183		1313	1327	1393	283
21K 2 x 10 ml.				1320			
Dup 9169 Except elutriated flake not acid treated, flake same — bulk as acid treated —	9175	1220		1243	1233	1250	183
	9176	1220		1247	1243	1263	190
	9177	1223		1243	1250	1270	183
4.2 24. 21K 7371							
Dup 9175	9178	1200		1343	1333	1400	507
	9179	1207		1367	1333	1410	453
	9180	1200		1353	1333	1420	530
21K 2 x 10 ml.				1354			

?/4063
/7354

Change of Elect but not acid treated —

		Cold	25	50	100	100½	Hot
Ra 725 B green soft lumpy granulary 4.2 of Elect treated but not acid treated 24.2	9181	1240		1243	1260	1277	183
	9182	1213		1190	1207	1227	123
	9183	1227		1233	1250	1270	173
21K 7422							
Dup 9181	9184	1187		1317	1296	1347	430
	9185	1180		1307	1313	1390	483
	9186	1177		1320	1313	1390	420
21K 2 d (0 El)				1311			
Ra 725 C 4.2 24.3 green soft powdery	9187	1240		1223	1260	1373	153
	9188	1243		1247	1240	1347	197
	9189	1237		1267	1260	1370	193
21K 7551							
Dup 9190	9190	1213		1367	1373	1433	467
	9191	1190		1313	1317	1367	427
	9192	1203		1350	1333	1400	427
21K 2 d (0 El)				1340			
Ra 725 D 4.2 Elect not acid — grass powdery + quite somehard lumps 24.1	9193	1223		1203	1260	1300	183
	9194	1203		1213	1253	1277	203
	9195	1213		1247	1277	1300	203
21K 7669							
Dup 9193	9196	1203		1313	1333	1400	420
	9197	1190		1320	1333	1420	427½
	9198	1167		1300	1320	1383	450
21K 2 d (0 El)							

$\frac{1340}{3}$ 0

$\frac{3933}{311}$

4.1	24	85.4
4.2	24	85.1
4.3	24	84.8
4.4	24	84.5
4.5	24	84.2
4.1	24.1	85.4
4.1	24.2	85.5
4.1	24.3	85.5
4.1	23.9	85.3
4.2	23.9	85
4.2	24.1	85.1
4.2	24.2	85.2
4.2	24.3	85.2
4.3	23.9	84.7
4.3	24.1	84.8
4.3	24.2	85
4.3	24.3	85
4.4	23.9	84.4
4.4	24.1	84.5
4.4	24.2	84.6
4.4	24.3	84.6

April 8th

Average of Bi groups 150th run	1228
average COLD cloth " "	1046 - Cond fricti
average pressure in porcelain "	1119
average diff pressure in 21% "	1130
" " 21 × 2.5 "	1130

In Bi pressure = porcelain = diff pressure Total
Oplet Tubes in Thermo Cook to Apl 8 17 -
of which 7 is close to 721
6 in pressure & 1 in Bismuth group -
No oplets in pressure = porcelain -

[ITEM FOUND IN BOOK]

		Cartridge	Ignition Mix	Charge 15 Bus @ 400 Bullet Wt @ 750	Charge 15 Bus @ 400 Bullet Wt @ 300	Charge 7½ Bus @ 300 Bullet Wt @ 300	O-N Efficiency (1000 Runs)
				6th Run	9th Run	13th Run	
671	A	72 No. 70	7.78	1943	2690	1900	84.4
"	B		7.57	1875	2660	1870	83.1
"	C		7.79	1881	2530	1760	78.2
"	D		7.89	1950	2667	1895	84.2
"	E		7.82	1950	2525	1840	81.8
672	A	72 No. 70 + 2% Sin	7.91	2100	2840	2005	89.1
"	B		7.89	2143	2860	2010	89.3
"	C		7.882	2000	2695	1985	88.2
"	D		7.845	1968	2620	1995	88.7
"	E		7.72	1925	2525	1930	85.8

772 | 2537 / 2316 / 2294 / 2274 | 326 / 129.3 / 32.3

These are results on some 72 pockets loaded regularly in new machine.

In mounting them into grids, regular pressures were used — that is S.P. 100, Corr., 150.

72 Mix # 1083.

W.E.H.

[ITEM FOUND IN BOOK]

		Pressure given @ output in psi.	Charge 15 hrs @ 400 Discharge @ 750 6th Run	Charge 15 hrs @ 400 Discharge @ 300 9th Run	Charge 7½ hrs @ 300 Discharge @ 300. 13th Run	A-h Efficiency (13th run)
673	A	50 Oz. S.P.+Corr.	2125	2400	1790	79.6%
"	B	" "	2200	2580	1787	79.4
674	A	100 Oz. "	1800	2450	1785	79.3
"	B	" "	1875	2490	1817	80.7
675	A	150 Oz. "	1500	2600	1815	80.6
"	B	" "	1937	2695	1970	87.6
676	A	200 Oz. "	1662	2510	1895	84.2
"	B	" "	1537	2620	1900	84.4
677	A	250 Oz. "	1275	2110	1590	70.6
"	B	" "	1325	2485	1890	84

Tes loaded in new machine.
Average weight - 7.8 grams.
Electrolyte - 21 % KOH.
Fe Mix # 1085.

The low pressures seem to hold up best at the high rate, but their efficiency is lower.

W.E.H.

Notebook, N-08-12-07.1

The only dated entry in this notebook is from December 1908. All entries are by Edison. The book contains notes and drawings regarding the preparation of nickel flake and the loading of the flake into the grids of storage battery cells. Some of the entries indicate the involvement of Walter N. Archer, George H. Hooper, Jr., and Charles Dally. Inserted into the book are 2 pages of notes by Edison. The front cover is labeled "Ent." The pages are unnumbered. Approximately 20 pages have been used.

Dec 7 - 1908

Notes on packing tubes with dif flake & green + varying quantities + other changes to get good side contact without breaking flake + to permit of swell of tube without cracking flake also results from old test tubes By sawing open + slicing mix in soaking treatment with acid - sugar etc to reduce -
Results put on glass with Beeswax for Micro

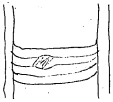
Different ni hydrox act different. 723 acts good - with 104 lot flake, dark flat not ax or 1hm Hydrogen the results are excellent 42 flake

When 718 NiOH is used with 4.8 104 lot f the results are different - we get this

flake at places one sided feed + very bad the dark show

Brake + too much green shows around edges

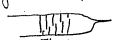
I notice harder lumps thus



The green is not uniform
No 723.

also the side feeding of flake is bad

This is cause of green being thrown to one side of the tubs + packed uneven for a little distance than it gives away as a whole + suffers displacement

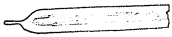


This —

To much flake is bad if it cant be evenly distributed over the whole surface

If we are to use more flake per dump. changes must be made at top dump -

Inactive tubes Hooper Cuts out after drying to 1 volt. how this appeared when cut open



This would imply that tube was not drying The tube is 250/1000 mix whereas this black strank is 125/1000 or a nickel Content of 1/4 of the cobalt — Hence if this is not drying then resistance Etc 1/4 of the Capacity of the tube is below a volt & undurable. The reason may be found in Connection of the mix from the walls, or poor circulation because full Capacity is attained by drying hot —

Old flat pocket green 4.2 flat fl. 104 feeds Eddy- but ends are bad.

Seems that there are but few flakes at Edges most flakes away from edge

this would represent

The amount remaining Edges — Old green

Daily Exports ox black no peacock

	50	100	150
	1252	1217	
Not ox or reduced H-719 723	1217	1240	1228
723	—	—	1259
719	—	—	1197
Ox + thru H Peacock	1199	1166	1132

OVR

Oxidized + thru Hydrogen

	Flask	Gram		Cell	50	100	150
	22	723	9672	1092	1125		
	22	719	9674	1090	1003		
	24	723	9706	1157	1189	1030	Co
	24	719	9708	1068	1263	766	C
Bulky	26	719	9905	1123	1193	1183	1190
	26	723	9907	1162	1255	1241	1133
"	27	719	9909	1150	1198	1188	1097
	27	723	9911	1153	1226	1287	1167
Slightly Bulky	28	719	9913	1176	1243	1232	1078
	28	723	9915	1185	1253	1158	1117
" "	29	719	9917	1190	1205	1106	1060
	29	723	9919	1196	1173	1000	983
Sample wrong	30	719	9921	1188	1192	1040	997
		723	9923	1186	1171	1053	953
Bulky	30	719	9	1215	1235	1120	1160
		723	11	1216	1296	1368	1138
	32	719	13	1201	1283	1271	1260
		723	15	1210	1348	1293	1213
	34	719	17	1079	1162	1135	1160
		723	19	1067	1143	1151	1180
	35	719	21	1043	1175	1168	1183
		723	23	1098	1164	1175	1157
	36	719	25	1200	1215	1210	1188
		723	27	1218	1239	1263	1230
	38	719	29	1240	1255	1078	1157
		723	31	1246	1271	1259	1050
		719	33	1130	1141	1140	1153
Bulky Cindy	37	723	35	1173	1183	1210	1192
Bulky	A1	719	37	1135	1210	1189	1148
		723	39	1140	1240	1260	1255

100 Run

719	1157
723	1206

Whole average	
50 Run	1199
100 "	1166
150	1132

Notoxidized Not Hydrogen ??

	Flask	Gram		Cell	50	100	150	200
Cindy Bulky	22	719	9660	1136	1218	1221	1215	1233
Hole in corner by hand		723	9662	1135	1212	1240	1260	1259
Hole in corner by hand	24	719	9676	1110	1195	1190	1192	
		723	9678	1156	1280	1216	1235	
	25	719	9865	1145	1225	1228	1243	
		723	9867	1175	1228	1280	1297	
Hole in corner Yellow Bulky Bulky	27	719	9869	1140	1208	1221	1242	
		723	9871	1145	1170	1250	1250	
Bulky	33	719	9873	1122	1177	1210	1199	
		723	9875	1148	1186	1242	1263	
"	26	719	9877	1055	1148	1188	1208	
		723	9879	1090	1145	1216	1225	
Vinegar and Hydrogen Bulky	28	719	9881	1150	1183	1226	1252	
		723	9883	1202	1232	1280	1278	
Bulky	29	719	9885	1080	1168	1205	1190	
		723	9887	1148	1211	1355	1398	
	30	719	9889	1126	1205	1211	1240	
		723	9891	1171	1270	1333	1410	
	32	719	9893	1161	1228	1291	1318	
		723	9895	1154	1281	1348	1230	
Bulky	34	719	9897	1100	1160	1223	1190	
		723	9899	1100	1200	1278	1242	
"	36	719	9901	1156	1215	1240	1200	
		723	9903 ?	1127	1237	1271	1260	
"	35	723	9931 ?	1097	1196	1145	1225	
		719	9933	1132	1273	1247	1285	
Slightly Cindy	37	719	9935	1128	1217	1119	1148	
		723	9937	1072	1183	1173	1112	
Bulky	38	719	9939?	1085	1183	1161	1093	
		723	9941	1153	1235	1227	1223	
	39	719	9943	1153	1233	1206	1148	
		723	9945	1143	1295	1311	1243	
Quite Yellow Yellow in it	40	719	9947	1147	1280	1270	1208	
		723	9949	1133	1305	1320	1291	
	41	719	1	1163	1248	1220	1245	
		723	3	1125	1261	1278	1305	
Cindy Bulky	42	719	5	1090	1165	1095	1093	
		723	7	1056	1163	1124	1146	

150 Run

719	1197
723	1259

	average
50 Run	1217
100	1240
150	1228

Bad 50+100

14 723 gained average 6+8

5 " lost " 5

average gain 32 ?

or 5 Sump per A 4

Average at
50 – 1252
100 1217

1166 –

100 Run average

718	719	723
1199	1166	1247

Daily Experiments with Black Oxide flocker H. no peacock

Time	COLD	50	100	150	200	Flock
718 59	1192	1301	1296	1236		Ox black H holder
719 62	1204	1227	1195	1100		H2SO4 pipe weak
723 65	1172	1237	1290	1241		4 hour 800
718 68	1119	1252	1255	1222		
719 71	1074	1149	1161	1105		2 hours 800
723 74	1062	1178	1224	1187		
718 77	1156	1282	—	1145		flocks burnt
719 80	1141	1217	1208	1130		
723 83	1098	1244	1268	1185		1 hours 800
718 86	1171	1276	1259	1169		Pa Replaced H not good
719 89	1136	1202	1175	1104		pipe not weak
723 92	1132	1226	1272	1217		4 hour 800
718 95	1196	1299	1267	1115		
719 98	1181	1239	1162			
723 101	1172	1287	1359			2 h 800
718 104	1201	1273	1271			Replaced Ox H pipe weak
719 107	1195	1231	1238			
723 110	1180	1250	1301			2 H 800
718 113	1217	1301	1190			
719 116	1266	1248	1209			
723 119	1239	1273	1280			4 H 800
718 122	1211	1309	1290			
719 125	1249	1256	1243			
723 128	1209	1257	1308			1 H 800
718 131	1188	1297	1298			Replaced H weak with pipe clean
719 134	1206	1209	1219			
723 137	1192	1234	1268			4 h 700
718 140	1210	1315	1300			
719 143	1148	1215	1212			
723 146	1130	1234	1268			2 h 700
718 149	1236	1267	1048			
719 152	1186	1239	1184			
723 155	1156	1271	1234			1 H 700
718 158	1221	1256	1008			Replaced Ox H with pipe clean
719 161	1255	1224	1045			Flake fragm
723 164	1197	1259	1105			4 h 1000
718 167	1232	1290	1136			
719 170	1231	1248	1080			
723 173	1203	1308	1289			2 h 1000
718 176	1220	1183	970			
719 179	1224	1221	1043			
723 182	1195	1238	1032			1 h 1000

		COLD	50	100	150	200		
7/18	185	1111	1209	1011				Rabbit H by Naolt Chemical Co
7/19	188	1093	1159	924				4 h 1000
7/23	191	1088	1214	975				
7/18	194	1130	1330	1286				Rabbit injected 5/29 100 cc H by Naolt Lot 13 in ear Injected orally 4 months
7/19	197	1091	1291	1343				24 800
7/23	200	1047	1272	1329				
7/18	203	1127	1298	1319				Hooks Slightly heavy bones
7/19	206	1090	1270	1279				4 h 700
7/23	209	1040	1265	1300				
7/18	212	1141	1311	1326				Tough sheath water purified
7/19	215	1097	1247	1221				4 h 800
7/23	217	1029	1248	1285				
7/18	221	1122	1292	1289				
7/19	224	1201	1231	1229				24 800
7/23	227	1186	1244	1292				

averages
50 Rum 1262
100 " 1217

Experts Continued -

As according to Archer Gulley - it is evidently hard as breaks or cracks flake at Edges + The heavy loading weights of green of right hand probably depends upon the reduction of a high hydration as in old green to a lowed hydration as in 723 + which is only attained by long drying. -

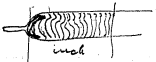
Old green also the flake dont stick to it like 723 = also the green stuck hard to the walls of tube - probably tube was not dried enough -

I notice even in 723 that there are green lumps which are evidently harder than the general mix
This distorts + makes floor of dump uneven + it probably comes from bad drying arrangements
I should be got rid off -

The thickness of flake clucks varies from 8 to 10 flakes thick

In using 4.9 104 flat flake it distributes fairly well for lower part of tube but when you approach the top the flake is so short that it comes down in a hump or humps or these are thrown to one side of the tube & makes it very bad, this action dont take place anywhere near so much when 4 or 4.2 ff is used — for some reason 7/8 green is worse than 7/23 but am not sure of this if it is true then 7/8 has more friction or something & tried an experiment of blowing air from atomizer down the side of the hopper this breaks up the clots of flake, will try up to make tubes with the air — going to try puffs of air & continuous stream of air —

The old way of cupped cap is very bad on top with tapered green it shows displacement one inch down



The new flat top is a great improvement & type 6 cable that of 6 can be used on the balloon it would be a further one

Lot 104 long flake 2 mm Copper not ox or fe;

20 milgms gives 673 flakes
104 greenly " 509 " but broken + turned + smaller
104 134 flakes to 4 milg dump
greenly 108 " " "
but on acct of small flakes turned over
probably less than 85 32% more
flake surface per dump in 104 f to greenly
of Cooks

Green that has water in it containing 20% glycerin + water evaporated under green feels dead dry - so internally lubricated - Results are that the flowing properties thus given is bad do the column of mix is easily displaced by contained blows of the plunger or it cracks or breaks at several points Especially at the top, It is evident green should have minimum flowing properties that the thickness of the green section should be diminished as far as practicable to restrain the flowing or displacement tendency + that the green itself should be dense so as not only to restrain

flow but to increase the amount of Nickel in each layer (12) in weight that in back — or

Tests of a tube with index shows that about like great resistance the mix will expand 1/10th of an inch on charge — one third of this due to putting in 30% KOH & LiOH. without current —
This shows that there should be a good top cap with no space whereby mix can flow into thereby displacing flake from the walls —

Req short tubes (old) soaked.
6 tubes in gallon 21% KOH for a week gave not a trace of LiOH in the gallon — the assay of tubes showed over .700 mlg per tube of 1.800 mlg KOH per tube Holland has the Record — this is about 1 gram per long tube that stays in fm KOH 21% — Holland

tests of beg cell in water
changed from time to time
showed L.O.H. kept coming out
after KOH was practically
all removed — but he has succeeded

Greyish-yellow gross — It flowed too
well, flowing gross is bad —

If flocks is thrown in tube is doubt
which is the case with present filler
when 4:2 or more of lot 104 is used
these doubts separated by falling
when tube is 1/2 filled but as it
gets near top the air doesn't get a
chance to separate the flakes
& they are thrown to one side

Now this forms a cup
& when the gross drops

the side X gets little the most as at S
hence this side gets pounded harder
& spout is and needles when column
cracks towards the spongy side as at m.

It is very essential that the flakes are all fresh as they fall from the feed hedge. The piling up is caused by hedging the slot where feed rod pushes through after a continual sizz & varying the feed by giving more movement to rod this forces much more flake through the aperture & is crowded & cakes together. If variable feed of flake is required do it must thicken the plunger & raise the gate to correspond & not change the strokes =

← Breaking of flake

appears to be due to bad flake feed piling up on one side. Is from a cup & this reacts to cause grown to be thrown to one side & here the hardest blows come & break the flake near tube sides. This is not always true

by samples cut open as one tube 739 - 19.8 opens 3.5 at 104 ft shows these diagonal breaks but I approached that the flake is piled up on other side - if not + 3.5 followed that chart - then the column is to work at 1.0

and a fuller piece put in 1/2 way up
Chamber Bore the previous thing

drink about 24/1000 inch

This will give an even floor to start on a 20 Column on with Even pressure + flat, Probably 2 would be better =

19.8 Green 739 – 3.6 fl lot 104 the flake marked with little graphite, ⊡ 4 pieces like this, filled fine

Turned up fine on both sides – no diagonal cracks – If graphite OK it will be a peach – It may be it only a coincidence that its not due to the graphite –

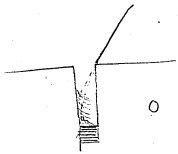
It seems that we cannot get an even floor with particles thru 20 think must have either thru 30 or 40

which will be more in proportion to the thickness of the sections, so there will not be so much crushing of large particles which serve to warp & deform the flow of flake forming the drink as well as disturb the layers below –

Corrugated flake is no its very much stuck together feeds bad & gives poor cohesion –

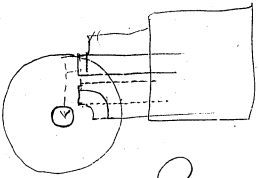
So far basket flake with natural bow of the flaking drum & all wheat & malt turned over or fine is the best & the tougher & more elastic the better —
but there should be a feed that dont cut sections or a higher fall for the top part of the tube —

Another Bug –



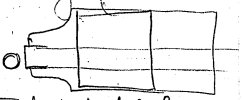
On account of the angle hopper there is a point in the tube where the flake piles up on one side & its always at the same place by cutting the tube at the right place it is found. Cut it anywhere hopping you only get it by accident =

The flake should fall nearly perpendicular, the rear on out machine is unnecessarily to one side on the flake is at wow used when we mixed flake & green together



This is way it is now with Fred O. It is changing it to dotted marks then the flake will fall nearly perpendicular, + through the air instead of over the side of a hopper any clotting that occurs will breakup most likely if feed slat down pencil it immediately —

Later — we are changing it thus



direct outside to get a perpendicular drop — for flake —

Since the fine green fines than 180 mesh
Can be flaked back to size required
or pressed in Hydraulic presses moistened
with water & dried so it can be successfully
it makes it commercially possible
to use green with cement. Cement will
work fine in the Hopper & distribute
evenly over the floor of the mix
with Cake

This will be a great aid to Everything
of the Cake =

There is no doubt but every Cake
we have ever made has of the dumped
on the side commencing an inch from the
top + ceasing 1/4 from the top —
This has been a very bad thing.

~~[illegible]~~

The 8 Rings on a long tube weigh
538 milligrammes

If 11 rings were used on perfting not,
spiral tube - but seam straight like rings
would be 3/8 apart & make use of
of Gallery - 25 grms -

I think this will be as strong as a
spiral tube, The seam will be
shorter & thus save weight & also
permit more mix to go in = It
also leads itself to solving that
infernal flake proposition of Contact
which like tube as I can use a
different plunger - also It
easier to manufacture

If lean green is used so it will
not burn up so much at tube
Contact & thus displace flake
it will be thus supposing we
keep flake constant

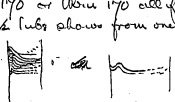
24 green	4 fl	190 grms per cell	
18 "	4 fl	253	63 grms more 1/4
16 "	4 fl	305	115 " "

If flake Contts 100 then 18 green Coal 14 Contts Edm
16 " 26 " "

So far we have not succeeded in getting more than ½ of the flake flukes in contact with the tube as per sawed sample & microscope If I only could get 70% in contact I would start factory

Now we remember that we cant use a straight tube as it bends on plug must spiral it to correct bending due to seam However I can perforate it diagonal so that nothing holding the tube in spiral the rows of perforation will be horizontal —

When using Reg Gallery green 739 — and 50% smaller flake with green thus 160 on 170 or thus 170 all fluid in — the cut ½ tube shows from one end to the other

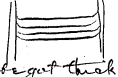


Evidently the green goes to one side then plunger comes green to flow above flake upto one side —

To obviate this green should be dumped in the Center of the tube — When we use Coarse material it dont go much to the sides as it lively & hard so the stratum is rather flat —

This seems to show that the dust should be taken out of green the 200 mesh - gravelly washed clean & dried well —

Tubs without spiral for one Experiment at least shows great Evenness & very little tendency for green to flow up the sides & make a dirty disturbing the flake — the Contracts are 60% or over — but there will be difficulty in making it I think — The spiral perhaps disturbs where the horizontal does not — The flake is however very thin at Edges



If it could be got thick the tube would be fast yet —

There is little doubt but that the layers are disturbed several deep, that the perforations is the principal cause of fill

5 dumps to a row of perfs
about 3½ dumps. 24. 4. between perforations, =

[ITEM FOUND IN BOOK]

12 A Ox+thrutt 30 f. — 1387. 150th Run
This tube is abnormal —
Bowl go black in acid except very slowly
acts like a good ff Tube + not like a bad
tube which shiny goes black —
Something to do with 1st Run treatment of
quiz — good tubes have mix cemented to acid
12A Slices easy ff black no sign of it —
perhaps this tube not fully developed —
Shows poor on outside not bright + few
flake surface — The flake has lost fire
+ is dull like poor tube but not so badly
broken — it shows flake up on one
side ~~up~~ fine

inner tube dull — holes not well filled
some hollow — not full flake —
Has good top end

Leadlit
8 OZ

This is the only tube Ox+N that is very
good — both tubes ff group good
It opens on seam very considerable
this week —

Bogatow
Has abnormal

[ITEM FOUND IN BOOK]

10268

outside bright metallic with coarse outside –
Slices every notice brown spot on each slice
as at B also around Edges flake cracked
away this would leave the center wasted
at Slices also – Bent go mummy black in
avid – where cavity open

dark shade in center

as fruit dried yellow

actual size

outside rough Soft more Metallic
yellow albedo / —
flakes in oblong seam little lumps
Same in 1021 —
Cover in all flakes not broken – ½ quart ½ broken –

Feb 29

Notebook, N-09-02-07

The two entries in this notebook are dated February 7, 1908, and February 7, 1909. The first entry is probably misdated. The book contains notes by Edison regarding tests of various metals and minerals as possible replacements for sapphire in phonograph reproducers. The notebook is similar to N-09-02-24 and was probably used at Edison's laboratory in Fort Myers, Florida. The pages are unnumbered. Only 3 pages have been used.

Feby 7 1908

Experts for Reproducing Balls
Glass -

Chromite not scratched by
Quartz but horrible
surface —

Jasper (Red) - not scratched
by Quartz but its no
bad surface — can't get
Checks out —

Obsidian - Scratched by
Quartz probably harder
than Ruby glass - Daddy
pulling Sodine fine rods to
make balls with —

Iron Vanadium alloy
bad surface —

Molybdenum Can't fuse
to Harder than Quartz
I think —

80 fr 20 B, melted + dropped
water - Very hard, scratch
Quartz - steel Cryolite +
bad surface -

Goldenrutile Chromium surface
OK Scratched Easy by
Quartz -

Pyrite Scratched by quartz
Brittle Easy - Brittle
Might do -

Rutile - Scratched Easy
by Quartz - Poly Xg -

Finally got Tungsten fused
good - Scratched Quartz + the
surface is pretty good for a
face 1/4 inch square there are
places flaked (where
2 or 3 35/1000 faces cored
or cut out - of Connecticut
Tungsten has abundant Carbon

February 7 1959

am going to add a little iron say 5 or 10% & see if can't get a flawless surface - its tough under graphite I think -

I found on further Experimenting that the Chilled Tungsten which of course has no Carbon Cuts the hardest Graphite with facility - Thus we have an analogue between Chilled Iron & Chilled Tungsten & probably the hardest substance its a metal known —

Notebook, N-09-02-24

The only dated entry in this notebook is from February 1909. The book contains one drawing by Edison of cylinder phonograph apparatus. A notation by Edison indicates that the book was used at his laboratory in Fort Myers, Florida. The pages are unnumbered. Only 2 pages have been used.

Feby 24 1909

A Meyer

Notebook, N-09-04-20.1

This notebook covers the period April 1909-April 1910. All entries are by Edison. The book is the first of two books that contain notes regarding attempts to find a hard, non-celluloid material for use in phonograph cylinders. Included are entries pertaining to the use of shellac and various other compounds to produce a substance that could be molded but would also be durable enough to sustain more threads per inch on the cylinder. There are several notes indicating Edison's application of the experimental results to disc records. Many of the entries in this book are rough notes that were subsequently transcribed into N-09-04-20.2. The front cover is labeled "Solvents 1909." The pages are unnumbered. Approximately 30 pages have been used.

April ~~[illegible]~~ 20th 1909

Recs at Exports on hand tough materials & solvents, matted those that crystalize out with small quantity shellac, Kauri Etc + those which do not crystalize out + we get hardness by the Shellac Kauri Etc Itself.

Those found so far that crystalize out & make the need alloy — is
Morphtolane — ok fine but ob poor turnice small
Monnitronaphtolene fine cheap + ok —
Shellac dont combine to rubbery stuff & Kauri ok —
Monobromocamphor — Very good one of the best at Crystal end —

Resorcin so good for solvent non cry. end lump good turbine considerable
Can go to limit until nearly all shellac chill quick — its harder than necessary its brittle + hard like fulton lac soften very little by heat hard — The alloy dont mix with Olsona acid at all

Stearic acid good at both ends
but better as a solvent than a
Copalchi must keep temperature
low or it Condenses the Sac
at high end showed use little
Acetanilide to make it more
limpid for pouring – very little
is required –

Phenacetin & Kauri crystal out
sep very hard – brittle, dense free
fresh Easy fine surface
Can vary proportions condensed

Kauri & Acetanilide Crystal out hard
very little Kauri necessary to the
Copalchi & Acetanilide that
gives the hardness – brittle – Cheap
mix –

Monoethylphenol acts about same as
Nitronaphthalene but not so cheap
or Easy to make – Crystal –

Too soft highend – no

No

If the free cresols are not got rid of in the Nitro compound the Lot is ok or condemned to nuisance compound —

Triacetyl-hydroquinone – Crystal end Lot dissolves very easy works fairly well – afraid acetic that comes off attack mouth – This is not very Cheap – great royalty power – don't guarantee Lot

Monoacetronaphtalene with Lot so much lost can be put in that it will take 24 hours before it goes from soft to the hard state by the Nitro crystal out –

Phenylacetamide not good – dont crystal out well – system bad – No for Lot Too soft the highend

High end –

High end only bottle like button hac – just no hand

Carbon tr. Alkoxide Neg.
too sullenly —

Benzophenone – dont crystal out at once maybe tomorrow
Can carry hac to high percent –
dont condense — can't tell till
tomorrow – OK high end —
Its good solvent, dont smoke
much — probably good at
both ends tomorrow too bottle of crystal
but hard – at alkoxide end good tough hard – flexible at ends
this will work in Bad one have to high end ~~but it~~
Later the length must be long enough to be easily made
more shell —

Benzamilide — not good on
quick crystal end – fair on high
end I guess – tell tomorrow
Solvent power only fair get
thick + opaque when
moderately high up —
very bottle higher just like button
dry.

Cryst at hard End
fair –
Nosmell –

only good for
Cryslog End good –

Phenanthrene

Good Solvent cryst out with considerable
Sol, possibly more nice Cryst
out in crumbly large bulkes is
as thick as cooked cork practically
it foams on rising heat too much –
at Cryslg End about same as Naphthalene
No smell – High End hard but somewhat
brittle, may be ok

Bichloronaphthalene – No cryst – hy hard
too brittle – NG

Fluorene (Hydrocarbon) –

Works ok Cryst end yellow as good as
any – only good for
Cryslog End & hard dense good

High end good —
Dark need much
Trichloro —

Trichlorophenol —

Good solvent for shellac, dont
Crystalize out on flow cut many do so
in time — 24hr

This is fine for high end very hard & tough
24hr High end gelatinized well but dissolve strong - also hard on brittle
but — 1/3 chips off dish & mostly gelatinized any by heat blow
off too, safe to work with —

Tetrachlorophenol } mixed
& Trichlorophenol }

This is a terrible Crystalizer —
almost impossible make
high end it gets so thick —
dont gas but little it quickly
down when get cooler glassy
probably on boiling off of the
Chloro — Crust & high.
But only good for very smooth but
very hard & brittle chips act on
but to very hard — 24 hour flow
big button well not come off 1/3 chipped
off - brittle hard like button bac —
Crystal only come off of ~~the~~ yellow dense
very hard brittle (18) chips out on cutting
not wood cut like —

Cryst OK A1
Echanuly (unpl) -

Pyrocatechin —

No Cryst — solvent but it gelts thick very soon, only gauge when cold. Not good developer when cooler but too viscous & thick after 24 hours very hard (tough-leather) cut, cant get it free for stock and it is considerably big heat hard

Monobromo camphor Very fine solvent Crystalizes yellow Gutter Extremely hard inert wood chip - Has when bottle shellac & solution as Graphic as water & low temp — Has no tan actional Solvent - It also goes to high end very quickly with more shellac for Crystalizer End This is OK A1 — Big Efflorescence & gives bad surface on cut Jus inted Kill it for phono -

Methacetin - not good solvent Dont show Crystals - goes to high End the big log soft high up tough but soft - (dead)

good - (low temp)
Crystals - Cheap
good Solvent
needs an steam plate

Dinitrobenzol Meta
fine crystals very hard
not as hard as Mononitronaphthalene but passable
Can be by proper proportions - MP low &
good solvent, did it on hot plate -
disadvantage altho all very low temp
Thinks its good for printing at 150 Fahr
if you go too high it could crystal out
owing to very low temp & no smoke
this should be good on Crystals and
steam heat it would be also for
individual Spinners - & cheap
No smell - but unpleasantly the hard
Crystals of Dinitro help to make it
Nitroder than Naphthalene or Alcohol
its fine grain - Comes free of
dust all -
When you use maximum dye that could
still Crystalize its hard & tough
wood cut - comes off dull fine -

Only good to mix
with other things

Dimiro Solubl - Papa —
Not good solvent only mixes
Don't think it will answer

Battle marked Nitrō Solubl, dep crystl
Bad solvent, no margin on crystg out
high end sent away till morning
Not desirable —

Quinoline alkaloid —
Actual solvent, don't crystl,
Evidently heard + 6 drs the on pouring
leaves deposit of tarry too 6 drs the
~~so~~ if get too much Lac too
thick, It might be used with
other things to help dissolve

good high end
Cheap
fine solvent.

DMH 75¢ lb

Benzonaphtole

This is a peach solvent - can get a small margin Cutpoint end. Tough not very hard but may be better + all very limpid solution -
You can then proceed almost until its all shellac + still practically limpid Enough = 75 ¢ lb -
it would be cheap on high end of good as very little used -
No smoke - Low temperature
Very Tough + hard on high end -
Break for Petit - only slightly softens by heat hand. -
High end is practically Dhellac improved by being Tough -
horny cut -
24 hours - good - dont soften by heat hand
1/3 come off dish limpid solution - bad dish however -

Quinine

Dissolves shellac perfect - unlimited, its very thick at all dilutions - low temp, comes off plate good - probably can use 1/5 by wt -
Benzton very brittle but kind - comes off plate ok -

Bromalin - no dont melt decomp -

Methylacetanilide "Exalgin"
good solvent dont get viscous or thick except at high end but not too viscous to work - poor at great end no margin - some smoke at high end - might say considerable = higher flexible after 2 hours drying, should have more shellac. Comes off plate ok -

Hydrochinon — Melts rather high
insolubleable: dissolves Lac OK
ng for Crystal 2nd —
Smell say about butter tree
Later — not very delicate
Smokes some
Soften heat hands — sam/stick to dish
Whole Gallon / don't crack off —

Nitroso beta Naphthol ng
decomposes —

Dimethylamidoazobenzene Butter yellow —
dissolves shellac fair — Viscous — no crystal
poly ng — don't smelle —

Hexachlorobenzol.
MP so high that doing anything with it
it might embrace to MP with other
things to reduce MP - or to
change hardness.

Benzidine No forget - high and
Graphite mg - ... dont combine GG plate
at all.

Nitromononaphthalene Made by Dr
9 = Mg dont work well either Eu
to impure - if specially had it power on Flex

Carbazole Mg too high MP
Sublimes dry fully

Anthracinoy — Ent

very high MP — sublime terrible

Even in dish —

Cant do anything with it —

Might do to mix —

Rosorcin — good adhesive

No coyet — but the high end

but little coy down low end + very

hard. Enough — its really thick

very little smoke — bubbles

on heating — must be stirred

Hard + very tough in small cuts chips. on heavy

cuts — stick to knife / 2 broke away by cutting the

good if hard + tough (end) and no coyet (end)

dont flavourably coy — low — and smoke —

Hydronaphtol — good adhesive

high end no coy — very little

smoke, melts fairly easy Viscous

must be well stirred

after 1 hour very hard — next to highest very

tough + hard — highest extremely hard + fine

Cut easy — dont adhere accurately — by by hand

Sports ends 1/4 chipped off

Low OCC Ambulex & Carbon Bisulph
high end only VEry heavy & bottle —
sticky to stick. Can't get a proof off

QWA Red glassy fusible Formal phenol
Condensation should be an unlimited
amount in Resorcin to liquid when?
should say 85% form The Condensation
product If a solvent is wanted
This is it off — see how it is in
morning

Lupus telfrachlor naphthalin
low end works splendid.
think the gray to be handled
yet + happy as QWA wants
Making some pure now

The mononitronap dont work like it
did in Tha — I made it by heating
glacial acetic & dissolving
Naph & adds in it +
putting in ordinary HNO_3
Then precipitated by water —
Crystl from EtOH. it worked
fine on low end — It may be
that the shellac I had was
def than what I am using
here —
The Mononitronap here made by
Dr. T. $HNO_3 + H_2SO_3$ — then
washed water soln &
pressed in press — I think
dissolved it in glacial A
+ crystal it out wash with
H_2O + then crystl from EtOH.
There is no low end with flake Naph
I am using — there is with
Kale & Ellis Fac 14C but poor
35C fac dont do any better.
on low end hence, the mononitronap
made by Acetic process must
be different from Reg way
in ~~[illegible]~~ HNO_3 or $HNO_3 + H_2SO_4$.

Chloral Hydrate & Lac ng
" Sleeve & Lac ng

Sleeve & Mangan + Sleeve acid + Lac
ng -

Sleeve acid + dilly Cephrachin
+ shellac ng

Lac + Phenanthrene good for
Shellac ng for yellow - Sufficiently Lith
by he + hand - Rough feeling + hard.

Lac + Pinakon - too thick mix
bubbly ng for yellow, as shellac
Edinburgh flexible bottom
Eosin + Pico lamp frozen

Salicylic Ha + Strych ng
don't mix well -

Naphthalene Chloride don't well
ng - also with Sleeve ng

Piperin – good solvent
bulbs flexible by heat & [illegible]
brittle cold stills [illegible]
brittle when flexible by cutting [illegible]
acetone clear & colorless high
shellac contents & bubbly also
more [illegible] slix to dissolved.

Cyanamide acid good solvent
~~[illegible]~~ poor follows higher
~~[illegible]~~ flexible –

Acid [illegible] curious
very sticky & viscous very
even with [illegible] shellac
bubbles but should make
a flexible varnish [illegible]

Copaiba acid & Lac
Very brittle — No

Benzoate Magnesium No

Rosin acid, high
Melting point — it goes
to liquid a fluid solvent
cooled to a hard. it would
Great Shellac for hardness
+ polish —

3rd	5th	6th
311	316	321

~~4th~~ 3.0 ~~5~~ —
~~6th~~ ~~7th~~
326 · 331

OK — 8th was little
Yellow —

~~Eg~~ 15 Stearic + 22 Shellac
Kept at very low temp in forming
mass having gone higher than is
just necessary to keep in form [illegible]
[illegible] for 3½ hours

and I am sure if proper appliances
were put to stamp regulation
1 to 2 hours if perfectly
practicable —

Yellows End

100 Shellac
60 Stearic. Melted stearic +
moment all melted reduced flame
very low + added shellac in solution
stirring after each addition until
flame to have heat to compensate
for Chill given by added shellac
should not exceed 240 Fahr
at 200 Stearic acid separates out
its nothing but a mechanical
Emulsion + must be stirred well
to get a fine emulsion — if you
go much higher than 240°
it will combine or that part
which is combined decomposes
& soften the yellow —

1st Button pound 1st 2 3rd 4th
436 — 441 446 451
5 6th 7 8th
456 461 506 511 518

525 532 550

for 40 minutes the Buttons are very light yellow & the right quality & OK — after that for 30 mins they get reddish & are not so tough because the long heat has caused Combination of the shellac with steam as the balloon if the dish was too hot & dider too cool — to get 1 hour or probably more Kettle showed 6 & boiled all over

" & not on the bottom
only. =
All of the bottom
even hours after making
got slightly more yellow.
It very much harder &
tougher —
There is no doubt but
that at around 240
its only an Emulsion
in Electric acid —
This principle of Emulsions
is of wide application
in the phono record
biz =

Chemicals to be made or bought

Tetrachloronaphtalene	modification a	MP 160	
Trichloronaphtalene			
Chloronaphtalic acid		MP 200	
Tribromoaniline		MP 117	
Dichloroanisic acid	MP 196		
Dibromoanisic "	" 173	B.P.	
Dibromoanthracene	" 221		
Tribromoanthracene	" 169		
Tetrabromoanthracene	" 254		
Dichloroanthracene	" 205		
Tetrachloroanthracene	" 220		
Monobromoanthraquinone	" 187		
Tetrabromobenzine	" 160		
Pentabromobenzine	" 240		
Tetrachlorobenzine	" 139	240	
Hexachlorobenzine	" 220	326	
Tribromopseudocumene	" 225		
Trichloromesitylene	" 205		
Mesitylene Sulphonamide	" 142		
Mesityl Bromophide	" 125		
Parabromobenzoic acid	" 251		
Dibromobenzoic "	" 223		
Tri "	" 234		
Chlorodiacylic acid	" 236		

	MP	BP
Dichlorobenzoic acid	201	
Bromoamidobenzoic acid	174	
Pentachlorobenzyl Alcohol	193	
Oxycamphor	137	
Tribromo-chinoline	173	
Chysogen	280	
Ethenyl-diamine	137	

Naphtalene treated with cupric oxide at 400 Centg yields several beautifully crystalizing hydrocarbons. C_9H_6 C_8H_6 C_6H_4

Dibromonaphtalene	76	above Hg
Tetrachloronaphtalene	182	
Monochloronaphtalene Tetrachloride	128	
Dichloronaphtalene "	172	
α-Naphthoic acid	160	
β- " "	180	
Dichloronaphthoquinone	189	
Chloroxynaphtaquinone	200	
Naphthyl = (Naphthalene)	154	Naphthalene Hg

	MP	
Naphthylene-diamine	175	
Dipyridine	108	
Trichloroquinone	164	
Trichlorohydroquinone	134	
Diacetyl Trihydroquinone	153	
Hexachlorobenzine		
Diacetyl-tetrachlorohydroquinone	245	

Resins are formed by the action of phosphoric anhydride on Aldehydes + essential oils

Bromosalicylic Acid	150	
Succinyl-phenol	118	330
Ammonium Sulphocyanate	159	
Thionesoal	180	
Tribromothionesoal	270	
Ortho Toluic Acid	102	
Metabromotoluic acid	205	
Phenylbromoacetic Acid	325	
Dichloroacetamide	96	238
Trichloroacetamide	136	238
Acetoluide	140	
Trichloroacetanilide	82	
Trichlorotoluide	102	

	MP	
Hydroacridine	169	
Benzamide	192	
Dimethylanthracene	200	
Dimethylanthraquinone	158	
Anthracene Orange	225	
Anthrachrysone	320	
Diamidoanthraquinone	236	
Trichlorobenzamide	176	
Dinitrochlorobenzene	103	335
Dibromoazobenzene	205	
Para bromobenzoic acid	251	
Benzylene-phenylamine	—	very high
Dyphenylsulphocarbamide	140	Sulfocarbanilide
Dyphenylcarbamide	205	
Cholesterin	144	
Chrysene	248	
phenoquinone		
Quinone-anilide		
Naphthaquinone	125	
Acetonaphthalamine		
Dinaphthyl	155	
Thio-aniline - Red aniline with S large amount resins	105	
Tetramethylbenzene	80 - Pseudocumene - Mesitylene	200

Acetnaphtalide	159	
Acenaphtene	95	
Acetone-resorcin	212	
Acet-ortho-toluide	149	
Amido-antipyrine	109	
Amido-azo-benzine		
" " Toluene		
Amyl-carbamate	60	220
" Carbolate	95	220
Benzile	90	348
Benzoyl-eugenol	70	
Benzyl-para cresol	70	
Benzyl sulphide	49	
" Carbamide	147	
Monobromacetanilide	164	
Bromolin	200	
Bromamide	117	
Metachloronitrobenzol	44	
Ortho " "	32	
Para " "	83	
Dimethyl hydroquinone	56	
" amido-azobenzine	56	
Dinitrophenol	113	
Dithienyl	83	

	MP	
Dithio-naphtol	180	210
Galanilide	205	
Hydrobenzamide	110	
Hydroquinone-dimethyl Ether	56	
Metanitroparatoluidine	114	
Alphanaphtoquinone	125	
Nitroaniline Meta	109	285
" Ortho	71	
" Para	147	
Nitrophenol Meta	96	
" Ortho	45	
" Para	112	
Nitrosoalphanaphtol	85	
Nitrosodimethylaniline	54	234
Oxam-ethane	115	
Oxanilide	245	
Oxydiphenylamine	82	340
Phenanthrenequinone	202	
Phenetol-carbamide para	173	
Phenocoll	95	
Monochloroparaphenol	87	217
Phorone	28	196
Phtalide	73	290
Phtalyl-diamide	219	

Piracone	42	
Retene	98	394
Stilbene	124	306
Tetra-bromo-phenol-phtalein	220	
Thiophene tetra bromide	112	326
Tolidin	129	
Trichlorophenol	65	243
Tribromoanilin	119	300
Trichloroquinone	165	
Triphenylguanidine	143	
Triphenylmethane	92	359
Benzylene-phenylamine	—	—
Mononitromesitylene	41	
Dinitromesitylene	86	
Dichloromesitylene	59	
Dinitro Xylene	93	
Phna	123	
Cumene mononitro	71	
Acetophenylhydrazin		
Acetophenon (Hypnon)		
Acetophenon monobromat		
" Dibromat		

January 27 1910

Experiments with Melted Sulphur + assay other things —

Alpha Naphtol N.G. —

" Naphthylamine N.G.

Phenanthrene — breaks up Crystals leaves dish — Cut probably immensely modified sulphur good Cut — little of it powerful leaves dish fine —

Resorcinol Cut No signs Crystals Cut like a Heather Decomposed Unfrutable —

Crude Anthracene N.G. —

Monochlorparaphenol N.G.

OVE

Sulphur & Rosin mix if altered
work on cooling with
Considerable Rosin the Gallon
is white, showing S & Rosin
finely divided - of course the
brittle but its very hard
showing possibly of many
Sulphur disseminated definitely (from)
the heavy to harden -
work up —

Latter Nature settles 2.
layers - Bottom layer probably
higher S but it very tough
Cut - Top layer nearly white
& very brittle but harder
not so brittle as Rosin -
The tough parts breaks with
glassy fracture showing no
Crystalizing - its very tough
yet a little brittle Curious
Wood Cut - something in Rosin
Combining with S =
perhaps twice Crystal by measuring

Rosin Telra + Shellac dont go -

Parachloroanline - hard glassy
mixes with Telra hardens it -
not much good ~~& gives~~
with Lac no - dont harden

Sulphoanlanlid with S &
Telra no

Cane Sugar & Shellac
alloys together fine
Hard glass - very little of
any affected by water

Telra & Lac dont alloy
Except with some Rosin w/ lac

good —

Crystalized Tetrachloronaphthalene
or Sulphur gives light yellow alloy
powdery but hard & smooth, just the
same in 24 hours — Thus in 1st quad
alloy struck, its ok for a hard,
precip. comes off clock cutter, polish
reached small precipitation of Tetra —
MP low & liquid — cooled 1st poured
its transparent as glass —
after cooling its very fine crystalline
white S alone which is corrosive.

---

good Hard brittle,
Phosphorous Anilide
work up —
Dont mix with Tetraline
mixes with electric
& very hard —

Mixed with Rosin OK
brittle Cut but Very hard
Dissolving in phos anhyd
Very very by heat with
would ok fine surface
think H_2O very effect at
Even with Rosin Impure
phos anhyd is red pure is
white + not affected
by H_2O apparently

April 27 1910

Lac + Spol chems
made by Goldstein

Rheumatic of head - Soft bitter taste
If heated too high decomposes
to red - Lac is too thick
Chl Tolnol - too thick
Ng

Cellulose Glycerol Decomp
about this Tolnol Chl
Makes a Rubber like
Stuff - Ng

Benzoyl-Benzoin - good Solvent
Lac thin, dont crypt out
its tough or is not affected
much by heat, at
ord temp it but little
flex - with small
amount of Lac I put
in it was clearly hard
its very tough Cut -

Anilin Melaphosphate
Melts but decomposes

Diosphenic acid
Decomp - with Lac
too much gas -

Anchoic acid
Azelaic " Mix -
Sebacylic "

Dec - dis Lac off
bubbles - (Thin)

Suberic acid -
Decomp when too high
Dis Lac off bubbles
(Thin) -

Amchusin-Alkasin
This is a fine stuff to blacken
Records in place of
Lamp black - Mells
OK!

Kauri

Dinitrobenzol requires temp of Distiller to be brought up so it sublimes some before it will dissolve — crystl good —
Extremely amusing Kauri makes it yellow amorph & pretty hard —
I stopped going high as the fumes seemed to affect me & I had no Ventilator on — its probably OK
Can't tell until boiler — big bubbles & get the liquid was fairly limpid
Comes away from dish fine —
Hard to get it — Solution dark

Acetamilide Rauni - goes in Sol
Easy dont clog - there is a scum
left on - Lumpid - Crystl Easy but
poor uneven button seems segregate out
wanty its very hard - not tough
If you go high up you have to raise heat
then it darkens + appears decomp
it smokes considerably -
High end sticky + poor -

Dr G Monoethanolamphiline - + Rauni
Dont work well there is an oil
separates out after button pressed
Cant tell anything by using
this impure subs

Notebook, N-09-04-20.2

This notebook covers the period April 1909-August 1910. All entries are by Edison. The book is the second of two books that contain notes regarding attempts to find a hard, non-celluloid material for use in phonograph cylinders. Included are entries pertaining to the use of shellac and various other compounds to produce a substance that could be molded but would also be durable enough to sustain more threads per inch on the cylinder. There are several notes indicating Edison's application of the experimental results to disc records. Some of the entries in this book were transcribed from N-09-04-20.1. The pages are unnumbered. Approximately 80 pages have been used.

Experiments to obtain a satisfactory material for moulding phono records by pouring into the mould from a liquid state of such a hardness and toughness that it approaches Celluloid - whereby from 400 to 600 threads can be used per inch of length and which shall be cheap, not wear or wear the saphire reproducer, that shall have sufficient shrinkage to permit of Extraction from the mould, that will not be Tackable or effected by the weather, H_2S CO_2 or water,

Book started April 20 1909 entered from daily work book -

Naphtalene, moth balls. - Dissolves shellac good, proportions which permit Nap to crystalize out seperately from the lac is best, its hard + tough on fine cut, cuts like wood, if proportions of lac increased Nap does not Crystal out and it remains soft.
Only method of experimenting is to have in a small dish approximately a definite amount of the melted solvent + To this add succesive increments of the material to be dissolved such as Shellac Rosin Manila Copal etc and pouring

out a small amount into a better dish after each increment has been added. Thus one can see if the 2 seperate out on cooling & produce a material of the desired character or if the maximum solution gives another desired material — I call the end where the solvent crystalizes the "low end" & the maximum solubility of the added material the "high end". the new material must not stick to mould —

The trouble with Naphtalene is that the low end is not quite tough enough & the smell is objectionable as it sublimes at even ordinary temperatures

Shellac

Mononitronaphtalene when pure as nitrated in glacial acetic + crystd from Alcohol. gives a good button at low end.

Monobromo camphor gives a low end button that is hard but proportions must be too accurately made to be practical + the surface after cutting gets an efflorescence — The high end when maximum practicable point is reach gives a button too easily affected by temperature —

Shellac

Resorcin is a fine solvent for shellac.
It gives at the high end a material which does not differ from shellac except it is a shade tougher = In the dish the liquid at high end is rather thick, there are some bubbles of gas comes, it must be stirred well very little smoke, a fine shaving is flexible, it chips on heavy cuts. Sticks to dish, on prying edge of 1½ inch button with knife it came off there may be trouble in sticking to mould. It scarcely softens any by heat of hand

Shellac

Anthraquinone

Very high MP sublimes terrible, even in the dish – can't do anything with it – might answer to mix

Hydronaphtol, This is made by Seabury and Johnson and is a trade name think its Beta-Naphtol, will see

Good solvent for high end – very little smoke melts fairly easy – viscous, must be well stirred – after one hour very hard – next to highest button, very tough and hard, highest is hard + fine, cut heady – scarcely any softening by heat of hand

Sticks to dish only 1/4 came off on prying

Shellac

Sulphocarbanilide made by L OH from action CS_2 on Aniline –
Works on high end only – very hard & probably brittle, Cant get off dish –

J W Aylsworth Red transparent fusible Condensation product of Phenol and Formaldehyde dissolved in unlimited amount in Melted Resorcin its limpid when 85% is the product + 15% Resorcin

Shellac

Hexachlorobenzol
MP so high cant do anything with it
it might answer to mix with other solvents
to raise MP or to change hardness—

Benzidine = no low end - high end brittle
dont come off plate. NG

Carbazol MP too high - sublimes so bad that
its impractical

Hydrochinon - MP rather high - sublimes
dissolves shellac ok low end no good.
high end button sticks to plate, softens by
heat of hand.

Nitroso-beta-Naphtol - NG decomposes

Shellac

Dimethylamidoazobenzine (Butter yellow) dissolves shellac fair - viscous - no low end dont smoke

Quinine Dissolves shellac perfect unlimited amount - th very thick at all stages - low temperature, comes off plate good. Button fraible brittle, but hard.

Bromalin NG - Dont melt - decomposes

Methylacetanilide "Exalgin" good solvent, dont get viscous or thick except at high end but not too viscous to work poor at low end no margin some smoke at high end might say considerable smoke high end flexible after 2 hours, possibly wants more shellac Comes off plate O.K.

Shellac

Benzonaphtol 75c lb Dethaen —

This is a peach solvent for shellac, small margin at crystal or low end, its tough not very hard, you can then proceed adding shellac until its nearly all shellac + is limpid enough to work practically. No smoke — low temperature —
Very tough + hard on high end, — be ok for petits pressed records. Only slightly softens by heat of hand
1/3 comes off dish by prying edge of button by knife. This may kill it in practice — DeHain price 75c lb it would be cheap enough as little is required

Shellac

Dinitrotoluol Para-

Not good solvent - only mixes - dont think it will answer - should try the Meta -

Bottle marked Nitrotoluol Bad solvent
Neg - probably Para -

Quinidine - Actual solvent - no low end - cools instantly hard and brittle
Comes off dish of itself, its too brittle, & if more lac is used its too thick to work It might be used with other things to help dissolve

Shellac

Metadinitrobenzol

This is a fine solvent for low end, plenty Margin, cools quick, melts and works at low temperature, Cheap - no smoke, that amounts to anything — vapor I think may affect one like Mononitrobenzine, Yellow low end button hard-woody cut JWC made some records they are fine he wants a little more toughness leaves dish perfect.

Shellac

Pyrocatechin No low end - its a solvent
but it gets thick very soon as you add lac
only goes when too hot, gets down
clear when dish removed - high end
very tough + hard, lead like cut.
Can't get it free from dish
Softens considerably by heat of hand

Methacetin Not a good solvent
No low end. high end n.g.

Shellac

Triacetyl-hydroquinone - Lac dissolves very
Easy - works fairly well, afraid acetic acid
comes off and would hurt mould -
Low end Great crystalizing power - its not
very cheap - dont condense Lac

Phenylacetamide NG no cryst sublimes
bad too brittle high end.

Carbon trichloride - too sublimeable NG

Shellac

Benzophenone - good solvent - dont smoke much, low end hard but brittle high end good tough small out flexible, its not hard enough but may want more shellac softens by heat of hand.

Benzamide Solvent power only fair - not good on low end goes + swells when moderately heated up, its very brittle on high end just like Cotton Pac

New

High End Comes from ~~of~~

dash

Shellac

Phenanthrene - Good solvent - good low end crystalizes about like Naphthalene: no smell hard end hard but somewhat brittle, may be OK —

Bichloronaphtalene - no low end high end too brittle NG.

Fluorene - Only good at Crystlzn End hard dense

further Experiments show it would work at Crystl End but not very tough but not high end tough Ductile and like it comes from dash

By mistake I entered it here

Shellac

Trichlorophenol - Good solvent dont cryst out on low end It is fine for high end in fact splendid cut flexible hard as button lac Handly softens any by heat of hand This seems unobjectionable for high end as its safe to work & can be obtained cheap at Niagara

Tetrachloronaphtalene

I mixed a little trichlorophenol with it say 1/3 or 1/4 and it at once became a good solvent yet I went way up before cryst end was reached then the button was dark hard but chipped This shows that many other good solvents probably can be used to give required solvent power - yet get a low end material about 1/3 at best point comes off dish by prying edge of button, scarcely any softening by heat hand -
At one of the low stages the material looks and acts like gutta Percha

NEW

Shellac

Tetrachloronaphthalene and Trichlornap mixed made by Dr. This is a terrible crystalizer almost impossible to make a high end it gets so thick - gases but little + this is probably due to impurity it quiets down quickly + free of gas. low end smooth but very hard + brittle chips out on heavy cut button 1/8 comes off by prying edge on high - ~~to~~ Cryst end Comes off Ok Yellow dense very hard chips out on cutting tts so hard, dont cut like lead.

Para - mononitrochloro benzol - or chlornitrobenzol
good solvent not good on low end cryst out but too crystalline, Smokes considerable too much for practice. Cryst end dont come off dish - high end soft & tough - softens by heat of hand.
Only made fine white brittle hard cryst
High end when cool tough as Celluloid + much harder. Stix dish
Quick; 24 hours high end leaves dish
Easy - probably not cost when I find it

Shellac -

Tetrachloronaphthalene, impure is a wonderful crystalizer, Dr G is making some pure.
Today Dr G made some purer and it works ok
The crystalizing power is enormous,
I keep putting in shellac until it got too thick to work & yet the button is on the lower or crystly end. It dont appear to be a solvent first lot of shellac put in globuled and I had to put in the 2nd lot & dir to get an even solution
Cant say how much shellac can get in by carefully requulating temp
scarcely any smoke, guess on little as more shellac put in. Mt fairly low but to get shellac in temp has to be raised considerably -
This material would be fine to mix with a solvent for high end that give toughness and yet by the powerful crystly properties give a low end material -

As high as it went - yellow very hard, small showing tough - dense - ok comes off ½ by prying - with a mix of this & other solvents should be able to get anything desired Continued

Kauri

Benznaphtol NG
Quinine NG
Phenanthrene NG
Methacetin NG
Benzanilide NG
Fluorene NG
Benzidine NG
Dimethylamidoazobenzine N.G.
Binitrotoluol fair low end, more brittle than others
Acetanilide NG
Pyrocatechin NG
Benzophenone very sticky all the way up except at extreme end, here Tough but too soft
Bichloronaphtalene Dry. acts funny — oxyd nearly all the way up but not hard somewhat trouble cut. might experiment more on this —
Resorcin — extremely hard at very low end
Epalgin NG —
Binitrotoluol — low end not hard —
Hydrochinone — part way up it is just as hard as like Kauri itself — it helps getting it into a liquid — wonderful amount for a quick Varnish —

Kauri

Trichlorobenzol n.g.
Mononitronaphtalene alpha NG

Shellac

Tetrachloronaphtalene Continued
See page where Trichlorophenol is
entered — by a mistake I recorded an
Input of Tetrachlnap + Trichlophenol —
See it for results —

Chloral hydrate NG

Pinakon, too thick, bubbly no cryst end
high end extraordinarily flexible bulbs
even at freezing temperature

Naphthalene Chloride Dont melt

Shellac

Hexachlorobenzol. high mp. dis shellac by stirring – short low end very hard, from yellow the next increment is non crystalline but what is remarkable the hard the next increment is as hard as long, high ends stick to dish, low end comes off auto only 2 low end buttons,

Piperin – good solvent, flexible by heat of hand, brittle cold, Chrisbo quick when at high end very little acetanilide clears solution of bubbles, and makes it limpid, stick to dish – no low end

Shellac

Cyanamylic acid good solvent - poor on Crystal end, too flexible at high end

Cressotinic Acid - Curious - very sticky and viscous, ropy even with lots of shellac bubbles bad - Should make a flexible varnish, its Phenomonal -

Copaiic Acid Very brittle NG

Benzoate Manganese - NG

Rosolic Acid MP high - it goes to liquid, if melted solvent is found it might beat shellac for hardness + polish -

Rosolic Acid – powdered

Resorcin – not good solvent, gases high end – apparently no low end

Dinitrotoluol. fair solvent, one on Crystal end – ng – too brittle, high end porous from gas, brittle –

Mononitronaphthalene Alpha crude – NG

Hydrochinon + Rosolic low down there is a proportion that is extremely hard – not tough

Resorcin, there is a point about the middle where very hard – not tough –

Rosolic acid

Quinine NG
Amido azobenzol NG
Benzidine 1st button very stiff tough pitch
others brittle, bubbly.

Hydroquinone Bi acetyl –

Hard but poor at low end, then sticky
then very hard + powdery cut, then
at highest end brittle powdery.

Phenylacetamide – Good Solvent
tough stiff Pitch at low end

Bichloronaphthalene NG

Pyrocatechin NG
Acetanilide NG
Para toluidin NG
Dinitrobenzol NG
Resorcin NG
Benzidine – Base NG
Paraphenylenediamine very hard
high end, brittle –

Rosolic acid

Metatoluendiamine – Extra length pitch
lead cut on very low end.

Toluidin Base	NG
Amidophenol, para	1st button low end very hard
Amidoazobenzene	NG
Toluylendiamine	NG
Metaphenylen	NG
Amidophenol, ortho	1st 3 buttons hard –
drugy + chug cut	
Acetoludin Crude	NG

Evidently Rosolic acid
is not good for phono work

Phenomenon –

Shellac treated with ammonia until gets very dark then poured off – then water added which dissolves some of the shellac. If this is precipitated by HCl + washed free of acid + dried 2 or 3 days, then the low and in Di Nitro benzol is almost only 2 buttons but high and DONT stick to dish = it is not hard enough but just as tough as celluloid softens only little by heat of hand. could probably carry it higher although it was rather thick possibly some of the other solvents might be better. Evidently the first amount removed took some very sticky stuff out & have some of it and after HCl it melts in water + is sticky, but brittle cold. The large bulk not dissolved by ammonia say 90 to 95%. I will try + perhaps can get a high and that will leave dish alone – = just tried some with Di Nitrobenz coagulates apparently 2nd button – 1st but crypt. hard – no better than reg lac + not lumpy

Shellac

think some of the other solvents will work —

Next morning highest + big button, 1/2 stuck to dish. But its just as tough if not tougher than celluloid which I compare with. A chip 1/8 long bends like celluloid = in fact I see no difference except the lac is harder and tougher — very little softening by heat of hand. The only dif is that sheets or rods would break in bending much.

New

Acetyl Cellulose

Phenylacetamide

This shows solvent powers only got 3 buttons 1st pulverent 2nd little harder semi trans 3rd hard stop got too thick its very much harder fine showing little flex its about as hard as Carnauba, but tougher = May be something in it by regulating the heat giving time = Its new anyhow Should expmt further.

Benzothexachloride

Brittle + powdery all way up 5 buttons last button very hard brittle, crystalline cuts to powder — hard to dissolve.

Monobromocamphor.

2 + 3rd button hard - 3rd button Extremely hard not tough dense, dirty white color, Can hardly break it 4th or last button break - deadump - soft tough - 2 + 3 buttons come off plate cuts,

Condensation product of Naphthalene + formaldehyde is like white shellac but with Cryst melted solvents dont work good softens very boldly by heat of hand - only tried Dinitrobenzol

NEW

Condensation product with H_2SO_4 + formaldehyde cooked until tough - dont dissolve in Dinitrobenzol haven't tried other solvents,

Acetylcellulose.

Dinitrotoluol dissolves slow - 4 buttons Cryst - hard - not so good as reg shellac - last 3 non cryst soft tough

Pyrocatechin NG
Resorcin NG

Acetanilide made only 3 buttons dont decompose, hard as glass so hard cant cut only scrape, and inch button 1/8 thick cant break it by hand - all this may be due to the Cellulose but possibly its acetanilide itself the Cellulose causing it to Cryst Exceedingly fine grain - comes off dull cuts + has a good surface Experiments should be made with acetanilide with other things to cause fine crystals this would lead to a low MP glassy hard material which could be made useful on account of coating + its great strength — It can be pressed hot into any shape — acetanilide costs 23 cents

NEW

Acetylcellulose

Alpha — mono nitronaphthalene Crude NG
Trichlorophenol — good solvent 3 Gallons
Crystal + ng — last button looks and acts
like Tough Shellac — Trichlophenol
seems to be a good general solvent
for organic amorph compounds

Amidophenol Para	NG	
Resorcin	NG	dissolves good
Amidoazobenzol	NG	" fair
Tolidin base	NG	" "

Acetoluidin Crude dis fair — very hard
Cant break powdery out, leaves dish
surface only fair — Sample saved

Benzidin base Dissolves good — high end
tougher and harder than Celluloid large
cut chips — dont leave dish — sample saved
fine surface on part broken of by prying

Acetamilide dont dissolve Aluminum Palmitate
Hard residue from BD dis in acetamide
hardens it strengthens it 2nd button
3rd button stiff pitch, flexible, pitting in shelf life
on 6th button Coagulates —

Acetylcellulose

Paraphenylen-diamine – hard – bad surface –
leaves dish pitty ng sample saved 3 buttons

Toluendiamin dissolves fair – Tougher +
harder than celluloid – dont leave dish
sample saved —

Dinitrobenzine, NG
Para Toluidin NG

Toluidine base, dissolves fair
tough as Celluloid high eld – dont
leave plate. saved sample.
brittle on heavy cut

Metatolunendiamin – Very hard to cut
saved sample –

Manilla Copal

Quinidine	NG
Quinine	"
Diphenylamine	"
Phenanthrene	"
Monobromocamphor	"
Tetrachloronaphthalin	"
Amidogobenzol	"
Phenylacetamide	"
Fluorene	"
Dibromonaphthalene	"
Methacetin	"

Quit on Manilla as it seems to be NG

Stearate of Alumina
Sol in hot Pet Benzine - Anhydrous -

Exalgin - mixes high heat, has lower
high end - too brittle, its like wax.
(ie cuts like stearic on high end -

Tetrachlornaphthalene - dis good
too soft - ng = Dr. I. has tri in it NG

Quinidine NG
Quinine NG
Phenanthrene NG

All too soft stopped on this -

New

By acting on Naphthalene dissolved in Chloride Sulphur hot, hots gas + then there is a condensation product like shellac looks like it pulls like it, resin. By boiling with alcohol something comes out + it gets stiffer when no more comes out. Boiling Benzol extracts a lacquer — the residue is tough + very sensitive to heat of hands — probably can vary depth hots resinous

New

Think this could be made to work OK —

Think the name is wrong

get Original Bottle

Toughness

Good A.1.

Shellac Continued

Bengal Chloride —

Has 3 bottles Crystalizes — 3rd bottle yellow very tough, flexible yet hard get more as they heat hand — Lead like flexibility — Chip curls bend not Extra hard

High end good tough — but dont behave dark — if heat goes too high Condenses Shellac —

Low melting point — dissolves good — with slight sublimation when get too hot — scarcely any smoke Limpid —

If this is Cheap & Easy made its OK = as its Toughness is great —

Recently made some can only get 2 bottles very tough but not hard — But with purified Tetrachlor about 4 or 5 bottles up where found a bottle or little Dichloroethylene stirred — gives all the toughness desired as its OK for toughness

New

Shellac

Hydroquinone Biacetyl —
Very fine solvent of shellac even
with lots of Shellac It
limpid as water — poor dark
2 Button Crystal End — no stix
dark — high end soft flexible
like lead — might do for varnish
put on hot —

Bibromonaphthalene — Not good
shellac floats — when more put in
OK — but poor Crystal End
High End must wait till long

New

Shellac

Benzophenone

Good solvent — No crystal and Ethanol

Soft ~~[illegible]~~ ~~[illegible]~~ high emp — will see if

get a film in morning — found 2 bottles had

gone yellow, hard & brittle, in morning — but not hard

enough to cute powders yet. a phenylpyrrolidone, great change

Sulphophenyl Dodecanol

Anthracene Bibromide ~~[illegible]~~

Melts too high —

New —

Toughness for Shellac

Shellac

Alpha Naphtol Shellac unlimited
Soft thick at all times no Crystal and
1st to 3rd Bullen sticky soft —
then gets Celluloid like
This would probably be good
to toughen the Crystal gen when
they prove brittle
Very small quantity would do
Don't Carbonize shellac up to
limit —
at a certain point up to tough & a
little soft Next Bullen hard —
tougher than celluloid chip bends
several times before breaking
Next Bullen harder & brittle but
small chip very tough — last
Bullen Very hard brittle like Bullen
but small chip tougher than Bullen

Tried this to toughen the Gritte Allore Nap
stuff but it dont do it interferes
Crystal yellow get to pliable —
what is small — that about make
shellac so pliable —

Shellac

Nitroaniline – not good solvent
no Cryst – 1st Soft 2nd hard brittle
NG

Iso-butyl phenol no cryst – ng

Chinolin Salicylic no cryst and NG

Turpentine Hydrochlorate
Condensed Shellac right off NG

Shellac — XN

Greenly took Nitro Nap Alcohol of
Chlorinated it without Cottrizer
until solid on cooling — pressed out in
cloth till Canary yellow —
Then put some in 2½% KOH,
Boiled it till nearly whole dissolved
was out, still some particles that
had settled thus — washed free
KOH dried not perfectly free water
& tried with shellac — Work
up to the limit of viscosity &
Cast out Not very thin liquid
Addit Cardamo Che shellac
bullons stuck to dish in Cooler
possibly 62 OR, in moved —
It fairly tough on fine cut
when high up — It would be better
to be a little tougher.
This could be a big saving in cost
getting rid of Crystalizing & other
Manipulations — It can probably
be improved by getting some lower
N.P Chlorination

High point or end Comes off
plate into —
Something in the
Crude Anthracene that
is going to cook

Shellac

Treated Crude Anthracene
alcohol — not pure but point
not of alcohol, = very limpid
at high point but the Comes off
plate Anthracene

There was considerable Inflammy
had use dat, shellac

Run it down

Shellac

Good —

Chlorinated Silvant
Naptha, abt ½ chlid. Dry
took out & dissolved some
the white — dissolved — Half
alcohol — Not very sol —
The stuff that dissolved dis
(but pbly wd if more alc) filtered +
pressed by hand — dried —
Very lumpy — 5 Gallons
OK — good — not so tough enough —
but needs its nice to work —
Very lumpy up to almost burst
It flows from dissolving when
but little lace in but not
bad when considerable in
Bottom are redish not yellow —

0-054

Dr G. distilled it, this is 1st lot
~~[illegible]~~
which dissolved in alcohol —
Dont seem smoke so much
but at higher temp ~~[illegible]~~ or smoke
concentrates —

This is BETTER — MORE TOUGH
& Tough Enough Liquor
Sometimes Comes off smarts
Eyes —
~~[illegible]~~

2nd lot, Dr G which on distilling
had higher BP — not so alcohol
but wonder why if had more al —
in little drink has higher BP not
very much smoke about some or
less — smarts eyes when dropping
on paper = It dont take so
much lac before getting Smoke
than 1st lot, but its OK
Chills VERY quick = more Gritty than
the 1st = Dont come off drops so well on low end But
Comes off on HIGH END ? —

OVR

So far no better than Napa Telya CP.
but not quite as brittle, not so hard —
More Lubricant —
Apparently in 1st Lot there is a
long BP chlor stuff which
lengthens the fiber which is
absent in this higher BP —

The cellulose of the Solid Chlorid Napthin
made by Dr Q + not distilled & run
dissolving in Acetone —

That not sol in acetone very valuable
(B) Acetone's - MP a little high. fiber soon
A gets thick buttons good Crypt inert
does thick to work when it Condenses
A is longer cut than B —
Dent Soluble in acetone lumps
at right mix of solution crypt ace way
B up till gets too thick than fiber
Condenses — not so much smoke
probably some of A is in it
It cuts tough on small Cut
B dent come off about 18th Cutter up + comes off
Every factory sell in cotton flying
Evidently some part of Solvent.

Hardest + toughest yet

Naptha has a good material to Chlorinate — If CO_2 are fractionating it to separate the right body — then Chlorinate —

Highest of B next to bottom which condensed + which I stripped from dish when other flowed is the hardest + toughest yet

C = is the mother liquor of acetone from which B crystal out when cold. — This after cold was evap down and allowed to totally Evaporate leaving about as much residue of Crystal as B — Then dried — It's pumpid + very little distillable or smoke compared to A + less than B — MP lower — Lac dont involve my I expect when quite hot + considerable eliminating its OK when considerable Lac in It's too much affected by heat of hand low + high — think coming from something in acetone makes it so not desirable —

Good for tough
H Coneoff
dish

Shellac

CP Dichloroethylene. Crystal macaroni
MP 53 melts 60 greasy - too low
MP, fine solvent for shellac -
only 1 good button that took all
night Crystal - not hard, but tough
flex like Cellulose acetate by
hand - Dichloro might do
to mix to bring down high MP.

Trichlorotoluene, long thick
Crystal tough - Resembles
Tetra Nap in every
ways. MP OK lower
than Tetra Nap. Lumpiness
not very good crystal on
high End. Longest cut yet
nearly as flexy as Cellulose
scarcely yellow only by hand
COMES off dish OK

New

By this Tetra Nap made by Grossly from Nitro Nap a pound 3 times in gasoline then washing with 2% a little alcohol the sediment goes out on agitation & gasoline poured off it Crystalizes dead white

It works fine with Lac gives white bullion but entirely too brittle more so than yellow left in. I think 5 or 10% of Tetra Chlorotoluene would lengthen it out.

Neo

For Toughening

Tetra Nap

OEW

Only big lot yellow Tetra Nap Crypt
from Naphtha Nap & big fm C_6C_6 —
which gives all bitten white
Crypt. but chip out when cut
with knife + bitty, + also which
Condenses when too much
shellac or heat is made
Tough + big chip like Celluloid
by using Benzonaphtol
or Alpha Naphtol

Can get quite a hot in without
destroying Crypt's power
goes to 90 ?

Two should make any of
the Tetranaps work OK

A. Naphtol is 15c lb —

Benzonaphtol 60c lb —

too much A Nap it soften by heat hand too
much — Benzong is not so sensitive —
proper proportion it OK —
Note Bottom stick to dish Throughout also
so also

None or last of this page comes off dish

Acclaimed. Dont disturb
Crypt of Tetra Nap. its white
Safe Gittem up — it acts
like A. Naphtol & Benzyl and
+ is good if right proportion
+ is tough + also likely sensitive
to heat of hand if too much
Its light yellow Crypt + not very
sensitive to heat hand —

Tetra Toluene is just as tough
if not tougher + harder + just
sensitive to heat hand.

Finished that next morning Acclaimed
buttons which were sensitive to
heat hand were no longer
so, evidently Acclaimed slowly
crypt out as well —
Think this Combn is ok
but not so good as plain
Tetra Toluene which is
the standard of
perfection

Have just finished 5 trials of buttons
with Dirty yellow crystal Tetra Nap
which gives brittle buttons
Tried
Trichloroethanol 1 pounds
4 buttons threw no more shellac
& pound trialls for 2 inch of 3
more buttons —
4th button slightly brittle
5 " with extra punch ok very pliable
Cut a tough as hard as celluloid
scarcely bend after being in mouth
6th button with another punch Tinder
bends too easy
Tried to dissolve to heat + Condensed
Stix dish all way up
Quinine — brittle all way up
Stix dish — not Condensed
Makes nice lumps —
Hydroquinone brittle all way up
stick dish, Condensed Hard button
Epalgin (Methylacetanilide)
Makes very lumps, Tough on 2 pounds
begins gets loosened by head Stix dish
Fluorene, Tough on 4th button brittle
~~2nd~~ 2nd pound 5th button tough OK
~~bends~~ bends somewhat in mouth not as
good as Trichloroethanol

With large quantity Excalgin
Tetra Nap makes Celluloid
Leather — just as flexible
& tough — fine for wear
proof cloth
~~Tetra~~ Trichloroethanol long —
same thing
Even better tougher

Expts Angle 1910

Condensed Resin formaldehyde ~~phenol~~ mixed with flowed asbestos powder. The resin made more ~~crumbly~~ clear by adding Hexamethylene –

15 Resin
2 asbestos –
Little, thick some bubbles
Cold - Brittle hard

15 Resin
4 asbestos.
Thin, seems any bubbles
Thin as Table syrup probably
thinner & worse to work & thick
to put fibres in. Thin is I think ok
Cold brittle but stiff
(rough on edge & weight after by heat mass)

15 Resin
6 asbestos, thin like water & clear
Unnecessarily thin
Cold, very tough but, brittle somewhat too sensitive to heat of hand. ~~other~~ thing be ok with less asbestos

15. Resin
8 acetamide – too soft –
added some asbestos, but only little
& it was very thin, could use
dipping process with it,
abt as thick as table syrup
with asbestos in –
Can dent the glass when cold
with nail
The asbestos is not enough, but the
Edinorendmly tough, bends easily
with heat of hand. It probably
would be ok with more asbestos
on a paper or other backing
it certainly would not crack
from Expansion & Contraction
Inclined to think from 2 gms
acetamide to 15 Resin up
to 8 gms would work
depending on the amount
of asbestos. am not
drying some of the flooded

4 gm by least hand com.
draw it out long
ways

Has more reflex
powers than acetanilid
probably shade thinner
for some ailment

asbestos cut to well
not be ready before
Mng - sarabhai say (re) the
one with small quantity
asbestos -

15 Resin
2 Beta Naphtol

Some bubbles - little thicker than
Cable syrup - Cold bottle above
boiling for longer also, sent again by hand

15 Resin
4 Beta Nap
Then as table syrup
few bubbles
Cold tough cut bottle
Reflux Easy by hand, will be OK
with asbestos
Possibly too soft. 3 gm be safe

14 Rem
6 Bela Nap
Thm as Tablet
Syrup Thm & gum
about like water

15 Rem
8 Bela Nap
Thm as water

---

15 Rem -
Several doses of Salicylic
acid - not good as
Bela Nap or Acetanil

15 Rem + Phenacetin
Not good -

Expts to see how much floated asbestos powder 15 Resin 4 Acclaimed will take so it can be worked.

---

15 Resin –
4 acclaimed –
8 asbestos –

Very thin fluid dip –
about like thick table syrup –

17 Resin
4 acclaimed
8 asbestos
of about like CO glycerine.
Hard, curl chip. not tough but
clear & no bubbles Pots like this

15 Resin
4 accelerator
10 asbestos –
Like thick molasses
it pours OK but doesn't
quite run flat in the
dish – Cured cover
seems OK –

Scarcely at all sensitive to
heat of lamp

Not tough cut but curls
This is due to less accelerator
for tough cuts want 6 accelerator
etc. hard

15 Resin-
6 Acelamulcl
18 Asbestos,

Thick mcolasses, dont flatten
in dish, journal — it runs out of
hot dish OK Cold Tough
Cut very hard

15 Resin
6 Acelamulcl
15 Asbestos

Thicker than Thick Mcolasses
must run slowly out hot
dish - journal flat -
Think this may be too
thick to work conveniently
but can be worked
ok if have to —
Cold Tough Cut - very hard

Make for Patt

15 Resin
4 Acdanlid
8 Asbestos,

Monochloronaphthalene Liquid

dont dissolve Lac but swell.
like Tetra Nap - but almost
any granular Lac goes in -
bubbles considerably but
when poured in dull these
disappear probably vapor
of Monochloronap condenses
Lac runs together. The button
is ok cut. Like Celluloid is
fairly flex by heat hard +
to hand, not scratched by nail
wants great deal skinning
much shrinkage will do for
big ok —

Iso. Emulsal agents and
tamp — thin shortly the
15 hae 5 Telra Compound

5 hae
1. 700 Telramp + 16 drops Iso Emulsal
very thin so it takes lots
Chalk can add 60 drops
or 2 cc + add enough
amt Chalk + on cooling
~~Tel~~ hard but flexible
+ pliable, flex below
2 wrap not crack on
paper blanks —
Without Chalk soft
as Leather —
~~The~~ Try def liquids
to do same thing

List of chemicals which have been tried with Thelle
Up to May 15 1909

Naphthalene
Mononitronaphthalene
Monobromo camphor
Resorcin
Anthraquinone
Hydronaphtol
Sulphocarbolate
Hexachlorobenzene
Benzidine
Carbazol
Hydrochinon
Nitroso-b Naphtol
Dimethylamidoazobenzene
Quinine
Bromalin
Methylacetanilide Eserin
Benzonaphtol
Dinitrotoluol para
Quinidine
Dinitrobenzene Meta
Pyrocatechin
Methacetin
Triacetyl-hydroquinone
Phenylacetamide
Carbon tetrachloride

Phenacetin
Phenanthrene
Dichloronaphthalene
Fluorene
Trichlorophenol
Tetrachlorohydr. Dry
Mononitrochlorobenzol Para
Chloral Hydrate
Pyrokon
Naphthalene Chloride
Hexachlorobenzene
Piperin
Cyanuric acid
Chaulmo acid
Copaiba "
Benzoate Na
Rosolic acid
May 15 —

To Get Tried
~~Anthraquinone~~
Benzpheron ✓
Paraphenylene diamine
Naphthalene Dibromat ✓
Acetolidin

Chloronitrobenzol
Tolidin
Benzonaphthol
Benzolechloride
Naphthylamine hydrochlorate
Amidoazobenzol
Meta-Toluylenediamine
Orthoamidophenol
Hexachloronaphthol
Dibromoanthracene
Tolidin
Sulphophenol
Benzophenol

Notebook, N-09-07-13

This notebook contains dated entries from 1909, 1914, and 1915. All entries are by Edison. The book consists of notes and drawings regarding tests of various chemical compounds for use in phonograph records. The earliest entries indicate that the experiments probably applied to both cylinder and disc records. Inserted into the book is one loose page by an unidentified experimenter pertaining to the use of benzene and hydrochloric acid. The front cover is labeled "Disc Records 1909." The pages are unnumbered. Approximately 50 pages have been used.

July 13 1909

Experiments with Internal gwa 40 lb pressure

1 of Internal 3 of shellac or measuring amount of disturbances to see. we can find something that will make Compound Come free from mould Gelatin to get moist

Margin: — using a knife blade 1/2 finger nails measurement — Rag chips away from stick 1/4 of an inch of Gutta

No 1 Acetaminiche 1 2 3 4,

all stick to stick knife cracks off 1st. 1/8th — No 4 tough pliably — asphalum hard so can bend a little —

Phenacetin Stix only 1/8 chips Zoff —

Di chloro Gengal Green 500 gm

3 Expt 21 large Gelatin —

Make Milk Lumpie — Expt quite Steady

1st Gullon tougher — Chips 1/8 — after 1/2 hour 2nd 3rd + 4 Gullon pops up flexible —

4 Resorcin Chips 1/8th of area of Bullon

5 Benzophenol - makes it very Lumpy - Especially 3 & 4th Bullon - Enjoy flow 1/8 chip out last Bullon flexible -

6 = Fluorene
3rd & 4th Bullon mix
Very lumpy -

7 Carvanba - makes it about same thick - don't mix perfect - by stirring OK Emulsion

Fwd Sup now all he wants is something to make Tetrachlorap Shellac Compound more limpid at same temp so he can centrifuge it = Says Dinitrobenzol is OK but wants something cheaper as Dinitro has to be very pure to work —
Stearic makes it more limpid —

Benzophenol is OK $4.00 lb

Exalgin: very limpid. very orange grade —
The one I used considerable in flex — where used only little it OK — This was fairly limpid

---

Phenylacetamide — No change in limpid —

Monomethylamp
limpid but too flex

Chlorinated Solvent Naphtha
wash Ethyl alcohol
Makes it Lumpy - acts
just same as Dinitrobenzol

D. Ettain new big lot of Celluloid

Dinitronaphtalene pure - very hard brittle
Cut 3 buttons - good Celyelozer -
4th button after 1/2 hour not
Crystal stix dried ~~but only~~
~~[illegible] although buttons~~
~~[illegible] brittle~~ no softening
M.P. is rather high - liquid is
black in all shapes - Turns
dirty white color crystals
Its a poor dei - Curious
Q 2.25 lb -

Very shiny surface on
Crystals buttons shows
glassy surface of dish -

Feby 12 1914.

Nickel flake mix removed from old returned cells - giving less than 100 dump
A4 —

Put in following Concentrate
Saturated Solution Cold
75 Fahr - 3 days -

Followed & disintegrated so flake & Ni can be separated

Potassium Sulfocyanate - possibly goes on Ni —

Sequette Salt when washed Ni goes Cadmium & Potassium Thorn fellow NG —

Potassium Sodium Tartrate & disolves some Ni — Works ok for disintegrating —

Potassium Citrate, disintegrated

Greenly is Equally with
disintegrating by using
Glycerin & KOH.
Spilling proper.
Consul proportions
this works fine —

Potassium Hyposulphite
Dissolves

Pot Bromide — Dissolves

Pot Chlorate " good
Nothing in Solution —

K Chromate No action
Na Nitrite very little disintegration Colors
liquid green — poly dissolves some

Na Nitrate No action
Na Sulphate "
Na Borate "
Na Chloride "

Up to this point K Chlorate is best,

Experiments Sept 20 1915
on Crude Phenol —

Treated with 1/2 & 1/2 H_2SO_4 & water — Separated & Evap'd down. The H_2SO_4 bal, turned same color as phenol — & gave considerable white crystals — These crystals only little soluble in water

Ditto Could HCl — gave a very large amount white crystals 6 or 8 times as much as H_2SO_4 & nearly all sol in water —

Appears to be some sulphate
asch Br — throws down 1/3 of the stuff — its probably a mixture —

Phosphoric acid Neg —

10% Conc HCl — filtered & Evap

50 cc phenol 12 cc Bi Sulphite
Saturated solution
Only leaves Bisulphate a very
little mush — looks good —

---

50 cc phenol treated great
Excess Conc HCl — OK
only little fluid mush

---

50 cc phenol a little dead
hydrox — followed — NG
lots mush

50 cc Phenol 10% HCl
Some muck-dry —
Wants more HCl —

50 cc phenol
10 gms cold fused
Bisulphate Na (fillers)
Lots Bisulphate dissolving
& some muck - Not quad

Another phenol
treated HCl - OK

50cc phenol
12 cc 1/2 + 1/2 H_2SO_4
Ok about same as HCl.
OK - Lumped small

50cc 2 1/2 cc HCl - Cone
Considerable muck
Shows enormous quantity
Salt dissolved in
phenol —

50cc phenol - glacial
phos acid - Lots muck
+ ~~Lots~~ sublimate
white crystals - what
are they —

Added Excess Conc HCl to phenol in 100 cc glass after 1/2 hour -

6 cc Solid Salt	7.19%
16 cc HCl —	19.51%
60 cc phenol	73.17

Residue of HCl & H_2SO_4 after driving off phenol & OK all dissolved in Acetone & mixture shaken & Acetone — NaCl salt, left

Solid Oxalic acid NG

Ignited Copper Sulphate - stirred in - NG

50 cc Rh .20 cc Conc HCl -
Very good - very little limpid residue -

Passed HCl gas thru 50 cc
Drops out large granular salts - Very little gas -

Experiments on
Paranitrophenylacetamide.

I took 100 grms of our 1.4 mixed acid & 26% Nitric

Used 20 grams CP Acetanilid powered powder gradually say in 5 minutes all in - Sparingly any heat is produced although it dissolves easily -

I moved flask at times in ice water with floating ice but it was probably unnecessary

A Water Cooled steel tank is all that I necessary I think -

The reason why it dont heat up is in my opinion

due to slow nitration I left it (after alles was dissolved) for 8 hours found on return the cobalt had almost gone solid although it was cold when I left it than it was when found solid –

Possibly it is all nitrated if not more H_2SO_4 caused 6-2 hours –

I then shook it & poured it out in beaker as a mush of Crystals added a little more water Cold –

Then passed in our small Vac filter got nice Cake yellow Tinge after pressing it down broke Vac & tried Cooling down in ice Method but practically only a milkness & no appreciable amount was in acid –

I then pressed Cake down hard got all liquid possible out added small amount of

Damp Nitroacetanilid is fairly soluble in Kerosene boiling

Acetanilid is much more sol—

Cold water, ~~[illegible]~~ 1/3" over the 3" Calc.—
this went then added another
1/3 of water, this went then
finally a 3rd —

The solution that came then
only showed Opal when
Chilled —

Evidently this is a fine way
to make Nitroacetanilid —
When proportions are ascertained

In Expanding with reduction of
Nitroacetanilide I guessed proportions
& got some fine Paper —

I then made a larger batch
according to Dr Swetzers
proportions

to wit

100 g Nitroacetanilid
500 dito Kerosene 116° C BP
250 " Iron 60 mesh
200 " 50° Be Soda Lyes

This would not reduce at all

in first Experiment lye liquor
intense black, in 2nd Experiment

liquor not black + iron Ferric
only result was a flocculent
stuff by Chilling out,

Evidently Soda too great excess

Of 20 grams Acetanilid used in the
8 hours nitrating got 22 grams
of what appears to be
Nitroacetanilide

I now put this 22 grms in reflux tube flask & add 60 cms petroleum 116° 130° to dissolve it, will add more till all dissolved when boiling —

Cant make any of Dudgeons formula work, neither can Chandler — yet I got it by guessing

We distilled Crude Para with Vac using screw & cloth at pump end & 2 pots after still — nearly all came down solid in 1st pot — Most came off at 205°C finally heat temp ~~off~~ up

to 255 @ 260-

Got off 85% 15% left of residue contained scarcely a trace of Para — Malaria is fine OK

This is OK

We also tried using the reduction pot mud after it is neutralized with Soda, distilled it - This appears to be OK will try another distillation & get yield. This cuts out water evaporation.

Phonograph

The only resinate soluble in Alcohol that is available as a substitute for Shellac is Resinate of Magnesia - Can get it syrupy fluid -

It softens but does not melt, right on hot plate - (B) the alcohol dissolved & Evaporated stuff - It is brittle & may not give proper strength to Disc.

Note -

Neoschema

Dissolve the substances in fume Benzol - Then Chill down Benzol till it solidifies Then in Crystalizing will throw out the thing dissolved in it -

Chill from bottom or sides

Get locks stuff in - use another poorer solvent mixed with it

Paraundophenol

Crude base -

Dissolves a little in

Crude 116° C BP Kerosene Hot & chilled out = flocculent ~~[illegible]~~

Very Rolin Acetone

190 BP Kerosene dissolves more but it may be in the Kerosene itself when I chill it

flocculent stuff tested in Paraldiphenol - it will be an increased amount of [illegible]

Solvents for Acetylparaphenylendiamin -

Acetone good

Pyridin good

Formaldehyde Hac fuse

Amylalcohol some

Benzylalcohol good amylacetate [illegible]

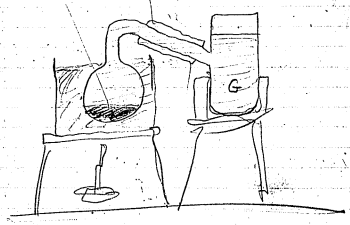
Benzol Methyl Tol Xyl - Carb Tetrach, poorer

Chloroform - Ether Benzine Turpentine -

Cyclohexan - Dont dissolve

Neo Scheme

X distill at say 220° Cent but decompose in air and vapor tension



The liquid used distills 325°C

X It should go over deposit in G

Alcohol Soluble Oils for Shellac in Calcutta to keep it from getting too brittle

Sassafras Oil Ok Dissolves
Origanum " "
Linseed N.G
Corn Oil N.G
Oil Cedar Wood Ok Dissolves
Safrol "
Rosin Oil fair.
Camphor Oil Ok Dissolves
Solvent Nap " "
Oil Cade - N.G " "
Heavy paraffin

over

~~H~~ Oel Benna NP
Ambrosia Oil — Ok Desalon
Castor Oil — Ok Desalon

Amedo Base —

Made by taking Reg Amedo liquor from filter press after Zinc is out, Neutralizing with NH till just acid + precipitate base —

Treated base with alcohol but till got out practically all —

Weight of Base 11.7 from
" of Zinc 9.5 "

It seems impossible to make Amedo Hydrochloride from the base made this way

Alcohol must decompose it or something wrong

Azo Dye Amido green
is reduced by Zinc dust
in Conc HCl — also by
NH4Cl —

Exhausting Para reduction
got dried & powdered Mass
with hot Alcohol —

75 grms powder
200 cc Al —

1st gave 25.250 grms Dry Para
phenylendiamin

2nd Exhaustion gave 1.150 gramm

3rd gave 98 milligramm

Residue dry 29.4 —

I will exhaust this water.

over

Took the mud after all is reduced
dried it in Vac dryer at 125° Fahr

Then powdered it thru 60 mesh

Then put the 75 grms into
boiling alcohol - stirred
for 5 minutes & poured it
into 3" Vac filter 2 papers
while stirrer going
Run through in 10 minutes
to bulked up mud - Took
this out & put it in 100
cc hot alcohol stirring
for 5 minutes thru it in
filter again — / When dry
Took it out again &
put in 50 cc Hot al -
& filtered again -

The alcohol got cold in
I want hot water
jacket around filter
to do good work -
a new one with this is
being made

29.4
26.3
3.1

Loss by acting on the 29.4 gram 3.1 grams

I have just powdered up some Crude Para mix right out of reduction pot & Vac Dried - found Enormous lot Coarse Iron not used.

After ~~[illegible]~~ powdering up & getting all Iron out then 60 mesh then powdering some of the iron found 644 grams of Metallic iron ~~not~~ going thru 60 mesh & 960 gram thru 60 mesh -

Experiments on Evap down
mother liquor of Amido ofles
Hydrochloric acid, its
first and — Chrysoidin calls
it Amido base

Took 1 lb paramido Chem
too much

Used 7540 cc water in 4
sections 175° Fahr —
Should say 5000 cc will do it
if Boiling carried in 5 sections
last lot can be used on
new lot —

116 grms ZnO dissolved in practically
free of any organic —
Ammonia Evaporating down
the water over

The amount of base from
the Evaporated water is

136
117
253
116 = Zn Reader
369

116 taken 450 grams
369
81

81 grams dry —

On ignition there is a white
residue which is probably
NaOH, no Zn —
This from prepared Gape
This must be got rid of

The Aryphenol Dye was
recovered got dimethylphenol from
Disclosure

1 Benzene Trace
2 Benzol Trace
3 D&N Alcohol good Solvent
4 Gasolene Trace
5 Camphor Oil fair
6 Kerosene Trace
7 Carbon Tetracl None
8 Pyridine fair to good
9 Chloroform Trace
10 Formaldehyde Trace
11 Amyl Alcohol fair
12 Benzaldehyde good Solvent
13 Fusel Oil fair
14 Petroleum Ether None
15 Acetate Amyl fairly sol
16 Glacial Acetic fairly sol
17 Wood Alcohol Sol Insoluble
18 Ammonia Some
19 Solvent Naphta Some

Amedothenol Hydrochlor

Solubility at 35° C. 19.0 grams in 100 cc

212° Fahr 77.0 grams in 100 cc

Boiling Alcohol
14 grams in 100 cc

Good Amedoplenal process –

After reduction filter Zinc metal off possibly – wash with boiling water –

Then neutralize so very faint acid.

Boil + filter – Chill out the Base, put water back with Cake from filter, Boil, then filter boiling – Chill liquid + get more base. Put Clear back on Cake + boil then Chill out base – finally when can get no base to Chill out. Put liquid on Cake + boil down to 1/2 bulk – filter boiling Chill out base. put liquor back on Cake + boil down to 1/4 of original bulk – filter boiling then Chill out

Evap small remainder of

liquor & save —

The various crops of Cane

show very little zinc or

other residue —

Now take base & add HCl &

small quantity water,

till clear but concentrated

because have proper HCl but

not too much — ~~HCl~~ HCl is to be

clear when cooling —

Cool & filter out crop of

Hydrochlorate — Then

to get a second crop

pass HCl cold through solution

you can get several

crops, finally evaporate

solution down to 1/2 &

Cool — pass HCl & you get

another crop on chilling

finally evap to dry & save

residue

The final Cake shows no smoke or change but keeps shape & turns white as Lunds Nell — it is black until burned —

From appearance of the Lunds Solution brought up by Christensen — it is 1st too dilute

2 I dont think the Dye is fully reduced —

When I evaporated down the small liquid residue about 25 cc I chilled out Dalt with base —

by doing this all the base can be got out clear without addition + dry salt can be added on by Alcohol

~~200 Dry Dye~~
~~200 cc 20% NaOH.~~
~~70 grams Zinc dust.~~
~~Checked — Gives more Zinc~~
~~Unsuccess,~~

OK =

570 Dye
450 Zn dust (ground process)
to 480,

500 lbs Solid Soda
add enough water to
make thick mush

Soap has 1st better Coke is
mix of Metallic Zinc
Zincate soda —
Dont go above 70 Cent,

to get the base, the necessary
degree is more machinery to
can be wrap to solid —
treated with alcohol

No Extra water is added
in this process at all

The crude base from the
200 cc weighs without ~~Solid~~
part while WET 18,950 gm
is now drying —

The base after drying
(from 200 cc) weighed 9,820 gram
This looks like full yield —

I treated the salt with alcohol but got only few milligrams - Probably unnecessary to treat salt or residue from final liquid
Weight from alcohol
45 mg, very impure I think

There is only 1½ lbs of pure for a 300 lb batch so not worth saving with trouble from alcohol manipulation

I took 50 grams of mother liquor amino residue powdered
Extracted in 200 cc water
Chilled ~~twice~~ Three times got 10.10 grms
good base out —
90% came out on first
Chilling — think that of

The powder is ground fine
150 mesh + 250 cc H_2O to 50
grams a slowly boiled
down to 175 cc that
35% fuls Chlor will take
out 95% of lime &
then evap to 75 cc all
will come out,

Amedo -
400 gals water
450 lbs NaOH solid
450 lbs Zinc dust
500 lbs Dyi or 1 batch

Benzidine -

Made batch in lab -
Took Casserole full
washed up Zinc far as
possible - filtered out
Soda highly diluted -
got pretty fair mechanical
separation of Zinc &
this is practical yet bulk
not easy -
The large bulk of Alkali sol
had a precip in Morning
filtered it off & found

Benzidine
it was Zinc — probably
decomposed from Zincate
by too great Excess of
Water — Must look
out for this —

The Hydroazobenzene I treated
with about 15% H_2SO_4
& got most of Zinc out
think Can get it all
out — but found some
Hydroazo in filtrate sol
showing it dissolves
somewhat in acid Solution
but not serious —

I ~~dere~~ powdered up the levigated Hydrozo put in 15% H_2SO_4 — & kept it warm 120° Fahr for ½ hour — stirring — The Hydrozo comes to top of liquid & needs stirring to get it in Contact with acid — The filtered solution when precip by NaOH showed lots Zinc — So this takes it out Easy & probably don't affect hydrozo —

Just tried filtering ~~Acc~~
Hydrazo crude from pot.
Diluted it with equal bulk
water, This weakens Alkali
so some Zincate decomp
It filters OK — Some of ZnO
runs thru dry cloth filter
but not thru same with
filter paper on top —
Well have to look out not
dilute alkali too much if
any but alcohol proceeds
as to be used — OK for Alcohol
if all soda washed out
so alcohol dont get loaded
with it —

Hydrocarbon is very soluble
Solvent Naph & Toluol, too sol in fact
to work out the chill and power
Kerosene works very good &
about 1/2 the solubility of Alcohol
Can bail the Kerosene which
floats above water & yet
all the Hydrogen comes out
beautifully white Each time
which is not the Case with
Alcohol –

It works out stuff right from
reduction pot filtered & washed
Line all in –

The only bug in the Kerosene adhering to the Crystals, ~~[illegible]~~ it seems impracticable to use Heat to dry as Hydro. will decompose to Azo

Could wash with Gasoline but this would be a dangerous Gasoline process

To get factory started will have to use Alcohol + then impurities afterwards —

1st Factory thing settled

Crude from reduction pot is to be diluted with equal bulk of water —

Run this through filter press + wash Cakes with water till practically free of NaOH, Cold water Can be used,

2nd Break up Cake Turn
on 1/4" screen in pans &
dry in Vacuum dryer at
not above 115 @ 120 28" Vac
It is best to get it as dry as
feasible to prevent Alcohol
getting full of water

3rd The Heat used to cause
Hydrazo to devolve should
be 15 to 20 deg below Boiling
point of Alcohol, I will
determine this exactly - this
is important, as heat
causes decomposition to
Azo & red color to Crystals
due to Azo -
Cold water 50° Fah or less

Well do for Cooking - but if lower temp can be obtained it will reduce the number of passes for dissolving & Chilling

The dried filter Cake from reduction pot, double bulk water, filtered to Cake & washed ~~we~~ with water - dried at 100° Fahr works OK with alcohol Even on boiling - The Azo from reduction tank shows up not reduced - it dissolves Even in alcohol than Hydrazo & think in

any Event Exhaustion with
Alcohol can take place just
at the boil + Every Exhaustion
gives colder Azo —

After Exhausting a batch
+ filling all cans out
by chilling + then added
large bulk of water
this precipitated Hydrogen
out like a milk or it
ran thru filter bad,
Almost impossible to
get it all by pouring
several times back over
Cake —
This process of precipitating

by water is Rotten-ing

So far Kerosene works best,

The only defect is Kero sticking to crystals —

Alcohol will do —

From alcohol, ~~the~~ Hydrazo

wets hand in 3% HCl solution —

in 30% Sol HCl wets perfect,

The 30% in Couple hours

70 cc ~~dissolved~~ clumps 1½ grams

Hydrotropo - very little dissolved
I diluted it greatly with
Water & neutralized it to
blue to fumes with
Milk lime - got quite a
Cake washed it 2 or 3
times on filter with
Water & dried it.

I found by chilling the
Water after filtering
Crystals of Benzoine
form but back on filter
very little - the Benzoin
is not slightly in water
we should chill solution
before filtering & use

Smallest quantity of water —

Think can use 30% HCl — & Add large quantity of Hydrazo & then only little water. It gets half-better cool at,

Note that when I use Kerosene, it gets very red & when batch of hydrazo is entirely exhausted & all chilled out Red is very Red showing out

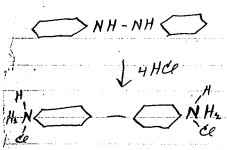
Reduction is very faulty &
some quicksilver is made
very soft in Ammonium chlor
Alcohol.

H_2 was 20% Kalth & hot Coals
I worked on was very warm
then attacked the Alcohol I
think -

Should be cold alcohol
put in & then Hydrogen -
I wonder if Alcohol is
really necessary -

[ITEM FOUND IN BOOK]

Hydrochloric Acid required for Conversion of Hydrazo-benzene into Benzidine Hydrochloride.



Hydrazo-benzene $C_6H_5 \cdot NH \cdot NH \cdot C_6H_5$

Benzidine Hydrochloride.

$4HCl = 146.0\,g$

$C_6H_5 \cdot NH \cdot NH \cdot C_6H_5 = 184\,g$

$146\,g\ HCl \Rightarrow 184\,g$ Hydrazobenzene.

$146 \times \frac{100}{184} = 79.5\,g\ HCl$ for 100 g Hydrazo-benzene.

$\frac{79.5}{1.19 \times .372} = 179.5\,cc$ of HCl (sp gr 1.19) for 100 g Hydrazo-benzene.

10/20 R.E.B.

Notebook, N-09-10-20

This notebook covers the period October-December 1909. It contains notes and drawings by Alexander N. Pierman regarding phonograph recording apparatus. Several entries indicate that some of this work may have been performed at Edison's laboratory at Fort Myers, Florida. At the end of the book are phonograph drawings by Edison with the notation "Fortune teller—." Inserted into the book are notes and drawings by Edison, including instructions from Edison to Pierman regarding the experiments. The front cover is labeled "Phono Recording." The pages are unnumbered, and several pages have been removed from the beginning of the book. Approximately 30 pages have been used.

starter Oct 20 – 09
AZH

Sand about 60 mesh
might be used, cannot be heard
on diaph. (1 gasket)

Mustard seed 20 mesh
cannot be used, rattles on
diaph. N. G. (2 gaskets)

Glass 20 mesh
~~rattles~~ on diaph N. G.
(2 gaskets)

Glass # 30 mesh
rattles on diaph N. G.
(2 gaskets)

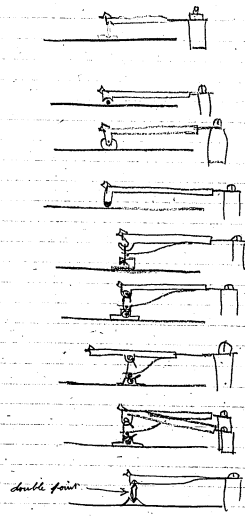
Glass # 50 mesh
slight-rattle (2 gaskets) 1 measure diaph

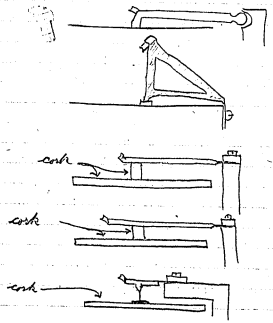
Glass # 50 mesh 2 measures diaph
slight-rattle

Tungsten #80 1 dose
N G

Tungsten #80 2 dose
N G

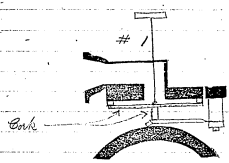
Tungsten #80 3 dose
N G


double point


cork
cork
cork

O.K. on standard tuns

Dec 8 - 09
WJP

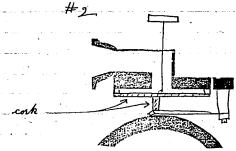


Cork diaphragm 1/32 thick with one layer of tissue paper fastened on with dope made of Castor Oil + Gum Rosin. The cork side of diaphragm out.

Amplitude of diaphragm adjusted by means of screw in center, dope between screw head and diaphragm.

O.K on standard time Dec 9-09
WHP

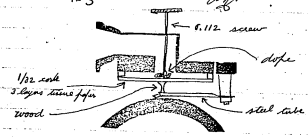
#2



Same as #1 except, 3 layers of tissue paper used on this diaphragm

Nov 15-09

#3



Same as #1 & #2 except the point holder is supported by a fine wood strut instead of cork.

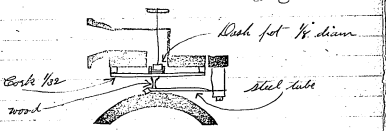
Louder than #1 & #2.

O.K.

on slow & fast piano, talking, yelling.

Dec 17 - 09

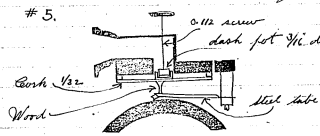
#4



Very good but a little sensitive.

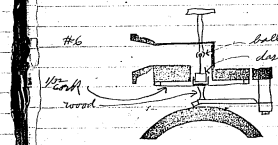
Dec 21 – 09

5.



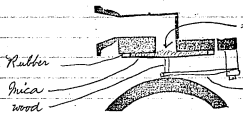
This is the best Recorder on piano, also works fine on voice; will not blast.

#6

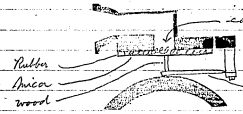


Same as #5 except ball & socket

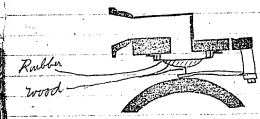
Dampening exp. Fld



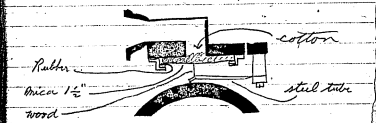
tender to stop blast



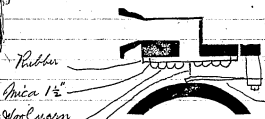
Same as above except 1½ in dia.



Fair not good

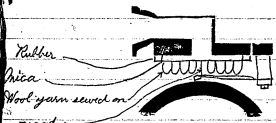


Good Keep for trial at Orange



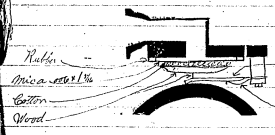
(two strands yarn used)

Good Ref for trial at Orange

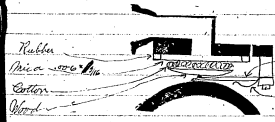


Same as above

N.G. four strands yarn used

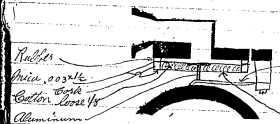


Four layers cotton working pressed down to 3/32 N. G.

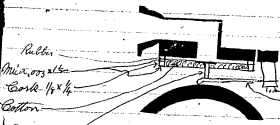


Same as above except 8 layers cotton pressed down to 1/8"

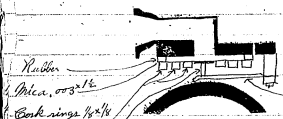
N. G.



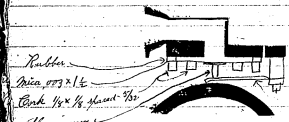
Good tone, very loud, slight flutter in high notes, reproducer will not hold it.



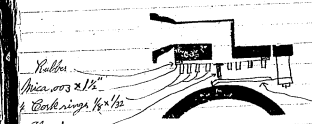
Fair with cotton loose, N.G. with cotton under pressure.



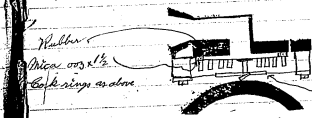
N. G. weak & muffled.



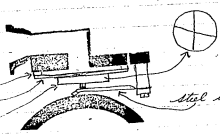
Works [illegible] but doubtfully



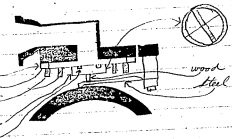
Loud but doubles



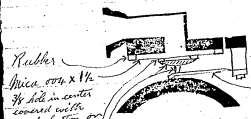
Fairly loud not enough swell.



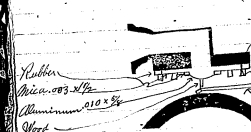
R. G.



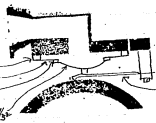
Considered good. held for trial at Orange



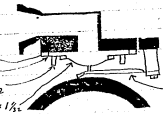
This is the most sensitive construction I ever tried, can be made to work perfect.



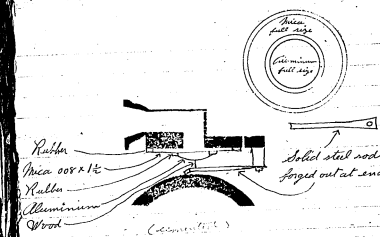
Sensitive, fair tone, held for trial at Camp



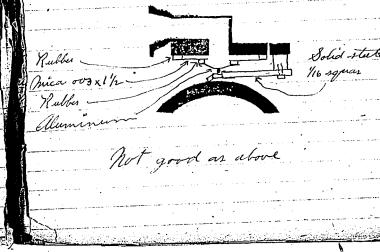
Sensitive. very hard bone. unnatural.



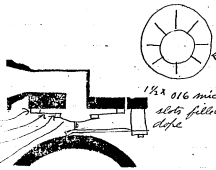
As above not so sensitive.



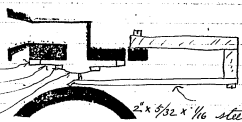
This is the best to date 3-5-10



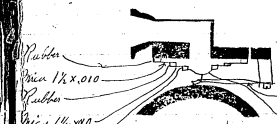
Not good as above



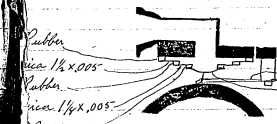
Good quality but weak



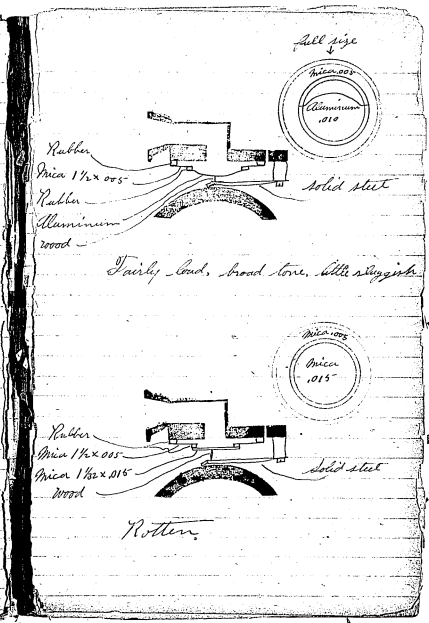
N.G.

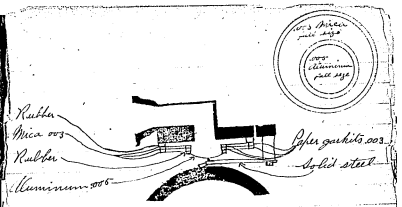


Not loud, muffled

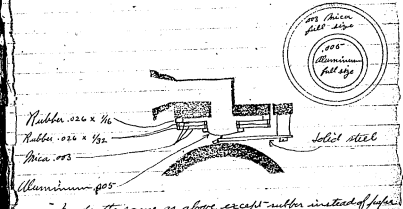


Louder than above, + clearer


Full size
Mica .005
Aluminum .010
Rubber
Mica 1 1/2 x .005
Rubber
Aluminum
Wood
Solid steel
Fairly loud, broad tone, little sluggish
Mica .005
Mica .015
Rubber
Mica 1 1/2 x .005
Mica 1 1/2 x .015
Wood
Solid steel
Rotten.



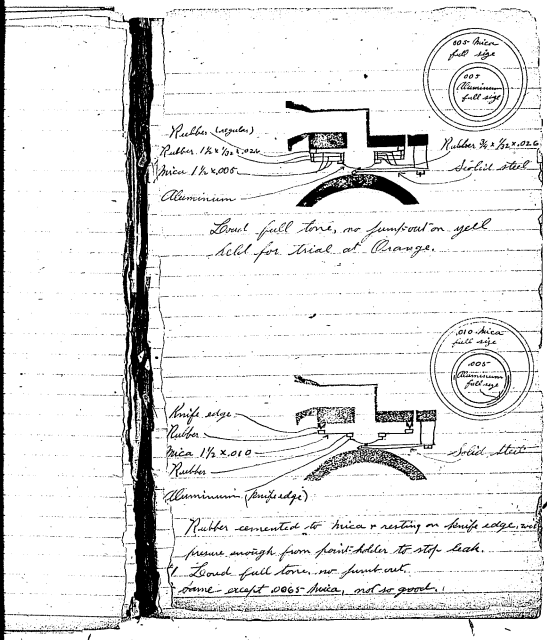
This quality not loud, holds well, not enough "give" to paper gaskets (will try rubber)

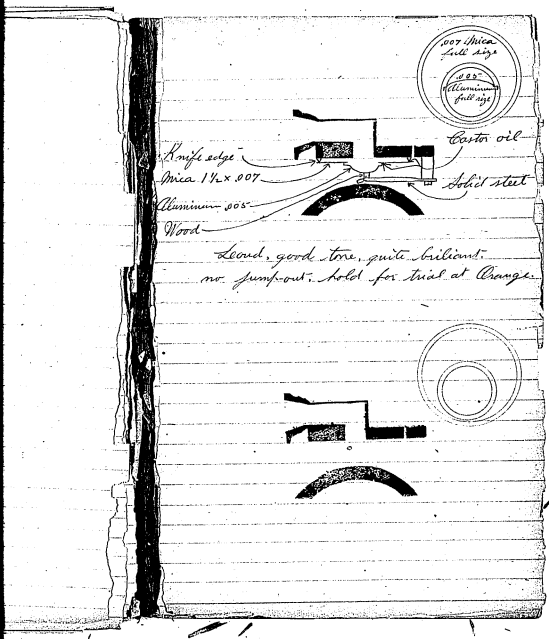


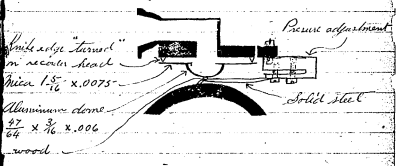
Made the same as above, except rubber instead of paper

Loud, very broad tone, little good on "yell"

(will try .005 mica. It made tone brighter + thinner.)


.005 Mica full size
.007 Aluminum full size
Rubber (regular)
Rubber 1½ x 1/32 x .020
Mica 1½ x .005
Aluminum
Rubber 3/4 x 1/32 x .020
Stellite steel
Load full tone, no fumfout on yell
bell for trial at Orange.
.010 Mica full size
.005 Aluminum full size
Knife edge
Rubber
Mica 1½ x .010
Rubber
Aluminum (knife edge)
Solid steel
Rubber cemented to mica & resting on knife edge, will
pressure enough from point-holder to strip back.
1. Load full tone, no fumfout.
same except .0065 Mica, not so good.


.007 Mica
fold edge
.005"
Aluminum
fold edge
Castor oil
Knife edge
Mica 1½ x .007
Solid steel
Aluminum .005
Wood
Loud, good tone, quite brilliant.
no jump-out. Sold for trial at Changes

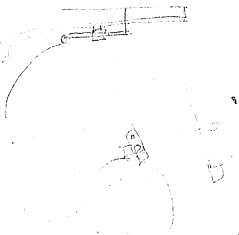


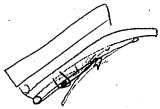
This recorder good on Piano and voice. articulation fine. scratch average.

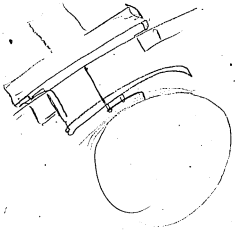
March 27. 1 Horse 1,50

Fortune Teller –

N-09-10-20







[ITEM FOUND IN BOOK]

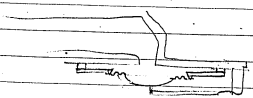
Pierman –

I want to try different thickness of felt between hammers & strings on Piano with the Great Recorder you have, the one with rubber on inlet tube I heard the other day, felt or cloth.

E

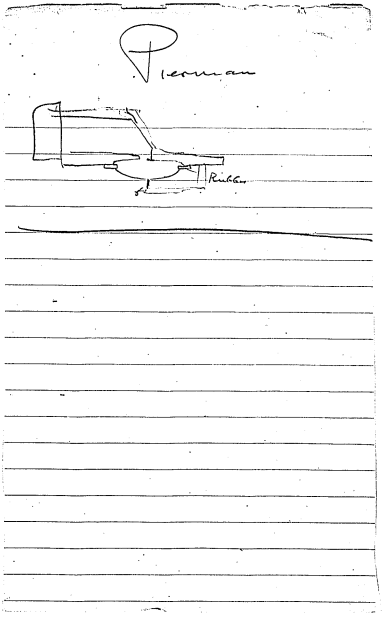
[ITEM FOUND IN BOOK]

Preview



Req 1" dia (rung) butt chamber
$1\frac{1}{2}$"

[ITEM FOUND IN BOOK]



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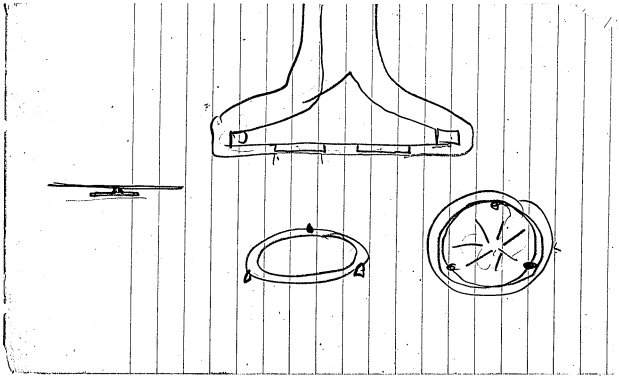

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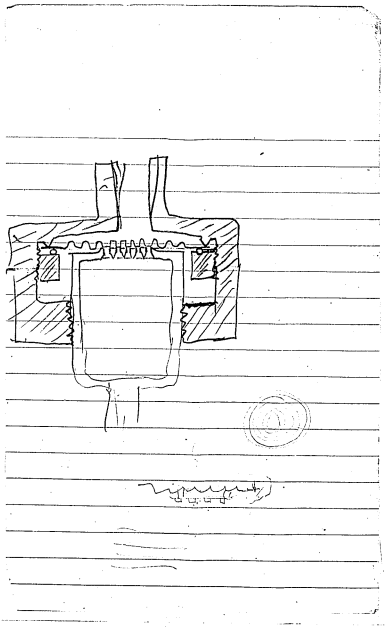

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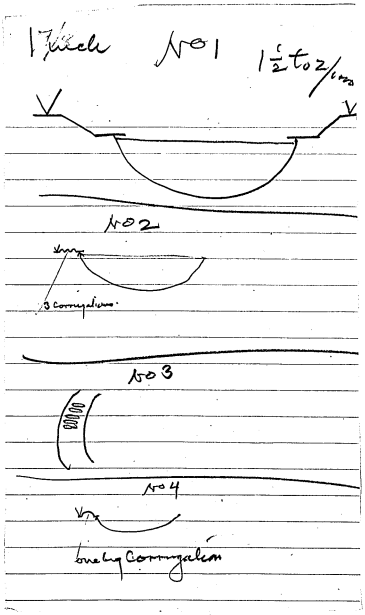

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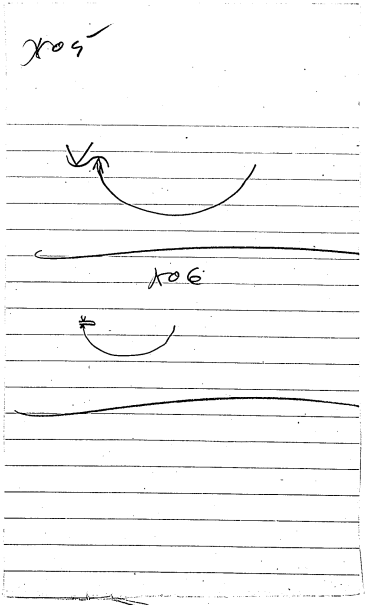

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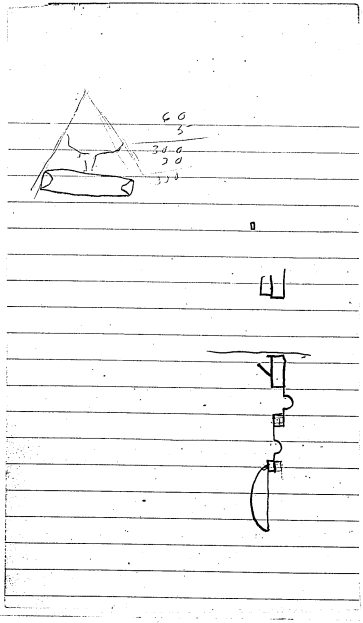

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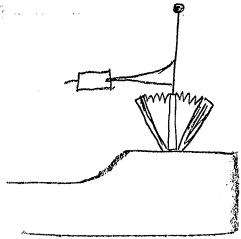

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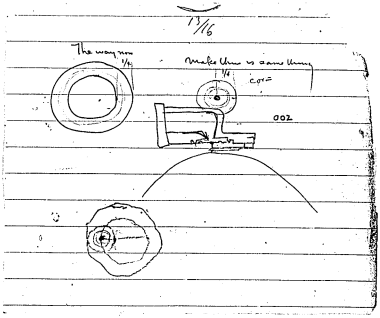

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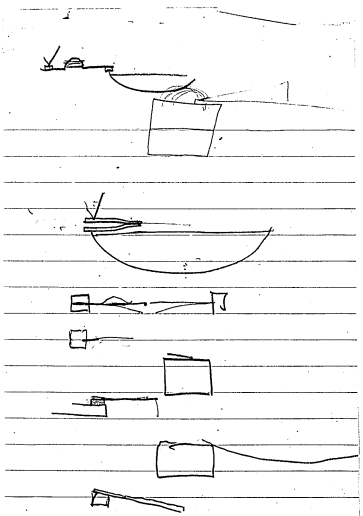

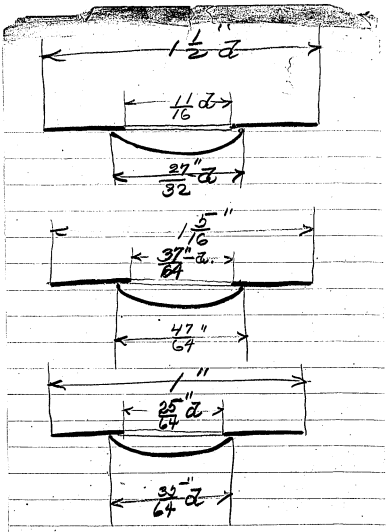

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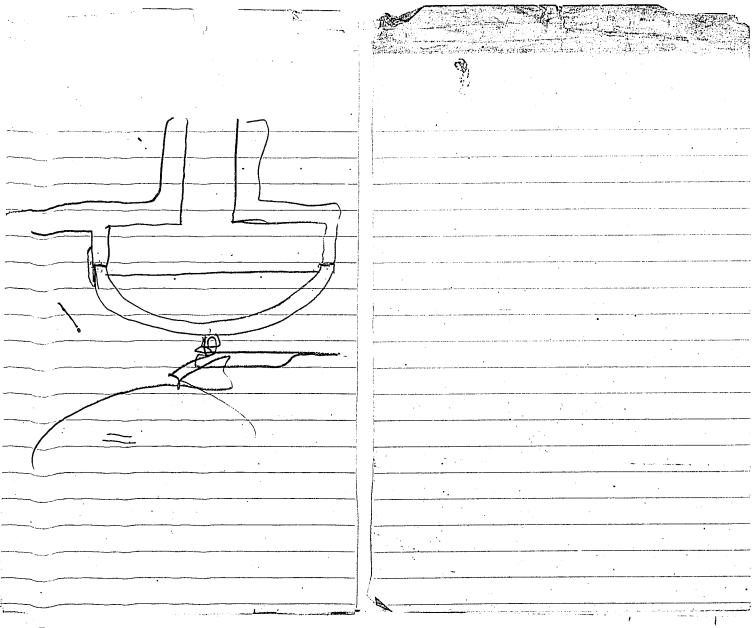


Notebook, N-Undated.17

This undated notebook was probably used sometime during the period 1909-1910. It contains a log by Edison of storage battery cell tests. The book appears to be part of a test series, but the other books have not been identified. One of the entries indicates the involvement of Ignacy Goldstein. The front cover is marked "Regulars" and is labeled "1201 Reg 1334 Reg." The pages are unnumbered. Approximately 40 pages have been used.

1201 Req	7515	3721	1143	1197	1223	433
	7461	3722	1130	1167	1177	397
1202 Req	7503	3723	1133	1180	1193	407
	7543	3724	1160	1217	1227	410
1203 Req	7655	3725	1117	1197	1223	420
	7547	3726	1140	1187	1203	413
1204 Req	7651	3727	1163	1197	1207	377
	7554	3728	1160	1207	1238	393
1205 Req	7722	3729	1167	1227	1240	393
	7693	3730	1180	1220	1233	383
1206 Req	7732	3731	1163	1200	1213	417
	7751	3732	1177	1210	1223	423
1207 Req	7681	3733	1153	1183	1197	380
	7625	3734	1160	1200	1217	367
1208 Req	7659	3735	1147	1210	1227	400
	7645	3736	1143	1200	1210	367
1209 Req	7648	3737	1127	1200	1227	437
	7667	3738	1163	1200	1210	443
1210 Req	7670	3739	1177	1220	1237	427
	7620	3740	1163	1250	1270	480
1211 Req	7551	3741	1157	1237	1250	480
	7524	3742	1157	1233	1250	513
1212 Req	7524	3743	1173	1233	1253	487
	7538	3744	1167	1237	1250	483

1213 Req	7533	3763	1083
	7560	3764	1063
1214 Req	7450	3765	1133
	7436	3766	1157
1215 Req	7416	3767	1107
	7465	3768	1087
1216 Req	7372	3773	1160
	7392	3774	1170
1217 Req	7382	3775	1163
	7380	3776	1120
1219 Req	7488	3777	1110
	7480	3778	1143
1218 Req	7528	3790	1140
	7449	3791	1140
1220 Req	7541	3792	1150
	7518	3793	1127
1221 Req	7357	3794	1157
	7349	3795	1137
1222 Req	7353	3796	1147
	7394	3797	1127
1223 Req	7346	3798	1150
	7345	3799	1177
1224 Req	7455	3800	1123
	7522	3801	1103

1200	1223	440
1200	1228	430
1227	1237	630
1237	1250	537
1220	1233	517
1170	1177	413
1210	1217	450
1220	1230	480
1217	1227	490
1177	1187	443
1187	1197	460
1180	1190	450
1200	1217	437
1187	1193	420
1207	1220	463
1193	1203	430
1217	1227	447
1220	1240	455
1230	1243	433
1200	1217	453
1230	1243	497
1200	1213	470
1183	1190	470
1180	1187	437

1178	1200	483	1200	1147	
1160	1173	493	1183	1147	

3763	1113	1063	1033	1020
3764	1117	1060	1040	1063

3763	913	
64	943	

Ra 1225 Rog	7430	3920	1233		1220	1250	447			
	7417	3921	1240		1200	1227	490			
Ra 1227 Rog	7574	3922	1187		1093	1143	443	1027	1067	373
S - Soft but Rog	7480	3923	1207		1083	1143	443	1033	1073	313
Ra 1228 Rog	7474	3924	1207		1173	1213	477			
	7470	3925	1190		1157	1183	377		2 1330/1167	
Ra 1229 Rog	7406	3926	1203		1133	1150	377			
	7465	3927	1207		1263	1287	527			
Ra 1230 Rog	7414	3928	1180		1160	1187	520			
	7516	3929	1223		1193	1220	520		2 1353/1176	
Ra 1231 Rog	7560	3930	1200		1260	1270	503			
Quite some black pink.	7551	3931	1177		1263	1273	513			
Ra 1232 Rog	7606	3932	1213		1260	1270	513			
Some black	7587	3933	1200		1220	1240	467			
Ra 1233 Rog	7544	3934	1183		1217	1237	467			
Some black	7592	3935	1183		1217	1237	457			
Ra 1234	7301	3936	1167		1207	1223	497			
	7377	3937	1157		1207	1223	483			

														400	500	
Ra 1235 Reg	7468	3938	1157		1180	1193	460			3962		447	1020			
	7473	3939	1160		1170	1190	460			3963		1083	950			
RA 1236 Reg	7572	3940	1197		1190	1223	373									
	7556	3941	1170		1173	1200	373									
Ra 1237 Reg	7449	3942	1237		1247	1257	470									
	7510	3943	1230		1233	1250	483									
Ra 1238 Reg	7451	3954	1147		1180	1233	473									
	7515	3955	1187		1200	1220	487									
Ra 1239 Reg	7664	3956	1110		1133	1150	463									
	7644	3957	1110		1107	1123	363									
											250	300		350		450
Ra 1240 Reg	7541	3958	1183		1223	1240	430				1210	1153		1140		1123
	7546	3959	1173		1200	1247	423				1177	1093		1093		1033
Ra 1241 Reg	7591	3960	1150		1160	1177	433									
	7634	3961	1160		1177	1190	437									
														150		
Ra 1242 Reg	7687	3962	1133		1113	1127	420	1163		1177		460		1157		
	7671	3963	1133		1117	1130	477	1150		1163		537		1150		
								1207		1242		1547				
								1177		1207		483				

Ra 1243 Rep	7572	3964	1167		1177	1190	490							
	7641	3965	1147		1150	1167	530							
Ra 1244 Rep	7583	3966	1120		1143	1150	363	1143	1157	417	1150			
Some black particles	7556	3967	1153		1147	1157	353	1150	1163	417	1193			
Ra 1247 Rep	7655	3968	1160		1140	1150	333	1123	1153	420	1213			
	7703	3969	1173		1117	1127	350	1120	1157	420	1140			
Ra 1246 Rep	7515	4028	1167		1200	1207	393							
Some black	7539	4029	1163		1200	1213	447							
1248 — Ra 9	7483	4030	1160		1210	1220	443							
Some black	7571	4031	1163		1203	1213	460							
1249 Rep	7523	4032	1120		1200	1210	457							
Some black	7551	4033	1127		1160	1193	433							
1251 Rep	7557	4034	1160		1173	1193	354							
	7433	4035	1107		1133	1157	327							
1250 Rep	7526	4036	1110		1133	1177	353							
	7678	4037	1127		1173	1183	357							
1252 Rep	7491	4038	1130		1167	1183	363							
	7529	4039	1067		1133	1177	373							

Rumours

150

200 250 300 350

1133 1200 1160 1147

1180 1187 1127 1173

200 250 300

1193 1157 1047 1027

1123 1173 997 983

400

3966 1147 3968 1037

3967 1083 69 970

450 500

3966 1090 960

67 1050 443

3968 1010 883

69 923 837

1253 Reg	7472	4040	1113	1157	1167	380	
	7473	4041	1123	1180	1197	430	
1254 Reg	7562	4042	1167	1180	1193	390	
	7520	4043	1157	1157	1163	420	
1255 Reg	7601	4044	1143	1150	1160	360	
	7560	4045	1130	1157	1170	403	
1256 Reg		4046	1160	1157	1187	438	
		4047	1167	1180	1197	449	
1257 Reg		4048	1140	1160	1177	390	
		4049	1163	1183	1197	400	
1258 Reg	7401	4110	1200	1253	1263	430	
	7477	4111	1180	1257	1263	453	
1259 Reg	7420	4112	1217	1257	1267	443	
	7401	4113	1193	1247	1253	443	
1260 Reg	7479	4114	1190	1247	1257	400	
	7409	4115	1190	1247	1253	400	
1261 Reg	7476	4116	1190	1247	1257	397	
	7493	4117	1216	1250	1260	393	

2 | 23 37
1169

Ra 1262 Rep	7364	4116									
	7411	4117									
Ra 1263 Rep	7326	4118	1223		1283	1290	430				
	7433	4119	1203		1257	1267	470				
Ra 1264 Rep	7465	4120	1193		1250	1263	433				
	7491	4121	1177		1243	1253	437				
Ra 1265 Rep	7427	4122	1183		1243	1253	447				
	7415	4123	1193		1253	1267	440				
1266	7455	4177									
	7486	4178									
1267	7396	4179									
	7391	4180									
1268 Rep	7439	4181									
	7390	4182									
1269 Rep	7471	4183	1183								
	7516	4184	1190								
1264	7465	4124	1170		1233	1243	440				
	7491	4125	1173		1233	1243	433				
1265	7427	4126	1167		1227	1240	397	1250	1273	483	1227
	7415	4127	1193		1257	1267	413	1267	1283	440	1233

2434
1270

Req - 1266	7458	4177	1157	1157	1170	390	1190	1200	403	1240	200 1247		
	7486	4178	[illegible]	1197	1210	400	1217	1237	400	1253	1253		
Req 1267	7396	4179		1217	1227	370	1213	1223	367	1257	1253		
	7371	4180		1220	1230	370	1210	1227	360	1250	1253		
Req 1268	7439	4181		1163	1177	313	1187	1200	300	1200	1250		
	7370	4182		1160	1177	313	1193	1200	300	1230	1250		
Req 1269	7471	4183	1183	1223	1253	100 1193	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	7376	4184	1190	1170	1180	1227	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
Req 1270	7377	4189	1227	1223	1233	1250	150 1247	200 1197	250 1170	300 1133	350 1077		
	7430	4190	1227	1273	1287	1243	1197	1133	1127	1247	990		
Req 1271	7377	4191	1230	1203	1213	1287	1230	1210	1170	1140	1090		
	7453	4192	1227	1223	1233	1257	1240	1193	1153	1117	1083		
Req 1272	7437	4193	1217	1230	1243	1243	1193	1153	1130	1117	1143		
	7586	4194	1193	1213	1223	1237	1230	1193	1153	1157	1107		
Req 1273	7460	4195	1197	1183	1200	1190	1187	1133	1107	1080	1030		
	7537	4196	1217	1227	1247	1227	1187	1133	1107	1073	1053		

4161 to 4197 were low 1100 to 1130
Run them 6 times a week or more
up or greased

Req 1274	7434	4197	1213		1230	1240	1223	1193	1183	1127													
	7478	4198	1170		1170	1180	1223	1227	1243	1237	1193	1170											
Req 1275	7440	4199	1163		1163	1170	310																
	7453	4200	1180		1200	1210	360																
Req 1277	7414	4201	1163		1173	1183	450																
	7532	4202	1167		1167	1173	437																
~~Req 1129~~	7461	4207	1193		1190	1197	360																
Req 1276	7525	4208	1243		1210	1217	317																
1278	7574	4235	1170		1123	1130	320																
	7548	4236	1167		1043	1050	333																
1279	7560	4237	1170		1153	1170	347																
	7512	4238	1150		1150	1160	323																
1280	7572	4239	1127		1133	1150	333																
	7622	4240	933		1063	1067	1067																
1281	7544	4241	1187		1160	1170	337	1200	1213	457	1223												
	7537	4242	1170		1110	1130	400	1163	1193	457	1190												

100 150 200 250 300 350 400 450 500

4199 to 4266 [illegible] 7522

Hot weather 84°

Fahr —

2/2196
1095

								100	150	200	250	300	
1282	7409	4251	1140	1180	1190	370	1217	1210	1253	1210	1200		
	7489	4252	1147	1193	1203	353	1200	1260	1250	1227	1200		
1283	7460	4253	1120	1143	1153	323	1200	1253	1257	1230	1200		
	7566	4254	1147	1183	1193	383	1233	1290	1267	1240	1253		
1284	7450	4255	1127	1167	1150	383	1210	1267	1267	1223	1200		
	7432	4256	1147	1187	1197	333	1233	1280	1267	1240	1257		
1285	7474	4257	1157	1177	1183	430							
	7475	4258	[illegible]	1173	1180	387							
1286	7501	4259	1157	1153	1160	333							
	7537	4260	[illegible]	1097	1107	273							
1287	7497	4261	[illegible]	1147	1153	357							
	7563	4262		1173	1180	330							
1288	7499	4263	1127	1130	1137	330							
	7510	4264	1173	1147	1153	327							
1289	7545	4265	1167	1170	1177	327							
	7533	4266	1130	1153	1163	810							

Had 1285 assay for Shearby Galbraith 0.06 %

accord to $HiSO_3$ 0.13 %
which is more

	350
4251	1130
4252	1127
4253	1200
4254	1180
4255	1170
4256	1180

1290	7651	4327	1170
	7661	4328	1153
1291	7645	4329	1160
	7644	4330	1150
1292	7685	4331	1193
	7748	4332	1130
1293	7622	4333	1120
	7748	4334	1163
1294	7637	4335	1130
	7646	4336	1110
1295	7675	4337	1143
	7675	4338	1153
1296	7586	4339	1150
	7641	4340	1123
1297	7594	4341	1133
	7671	4342	1147
1298	7695	4343	1110
	7697	4344	1103
1299	7699	4345	1150
	7676	4346	1137
1300	7593	4353	1127
	7586	4354	1170

1133	1140	463					
1117	1120	460					
1124	1140	460					
1113	1120	437					
1150	1157	460	1277	1287			
1057	1063	333	1180	1207			
1047	1053	340	1167	1180			
1063	1067	343	1203	1247			
1113	1117	357	1133	1143	1247		
1063	1067	377	1113	1280			
1107	1113	423	1190	1207	1243		
1110	1117	403	1183	1197	1280		
1117	1157	457	1210	1223	1277		
1067	1080	433	1177	1190	1230		
1130	1113	487	1217	1240	1283		
1100	1107	453	1220	1243	1267		
1107	1113	487	1197	1213	1250		
1100	1107	453	1193	1210	1250	200	250
1103	1110	483	1207	1223	1243	1227	1267
1140	1113	433	1197	1220	1250	1253	1280
1103	1110	417					
1120	1127	400					
	300	350					
4345	1260	1230					
6	1280	1287					

Cloud and temp 75°
cleared Reg 85 to 90
Half Dayp

Came all right
Long Cans

Run day
age reg temp
85 to 90 6

1301	7704	4433	1227		1233	1240	550	1260	1253	617		
	7703	4434	1243		1233	1240	540	1240	1260	530		
	7716	4435	1237		1233	1240	543	1257	1277	530		
	7712	4436	1253		1233	1240	523	1263	1280	547		
	7639	4437	1197		1193	1200	503	1257	1273	620		
	7654	4438	1243		1200	1207	433	1240	1250	587		
	7673	4439	1200		1200	1207	433	1237	1253	673		
	7629	4440	1213		1193	1200	460	1233	1250	767		
	7474	4441	1193		12			1217	1230	667		
	7440	4442	1193					1210	1227	667		
1306	7533	4492	1170		1200	1227	330					
	7542	4493	1147		1223	1246	333					
1307	7554	4494	1167		1233	1250	307					
	7543	4495	1157		1277	1290	330					
1308	7516	4496	1153		1250	1267	337					
	7503	4497	1157		1233	1250	357					
1309	7390	4498	1177		1217	1240	367					
	7422	4499	1177		1227	1247	353					

1310	7423	4500	1170	1200	1227	373
	7444	4501	1137	1213	1223	370
1311	7558	4502	1193	1247	1267	423
	7548	4503	1187	1250	1267	407
1312	7466	4504	1210	1250	1267	457
	7544	4505	1207	1253	1267	437
1313	7502	4506	1177	1233	1250	410
	7472	4507	1173	1210	1250	410
1314	7515	4508	1159	1317	1327	523
	7400	4509	1170	1250	1267	480
		4581	1173	1173	1187	523
1315	7602	4582	1030	1173	1190	500
	7665					
1316	7582	4583	1173	1167	1183	560
	7665	4584	1173	1183	1200	623

after the 41 Forks

1317	7582	4585	1207	1253	1263	450	1293	1307	633		
	7551	4586	1190	1223	1233	450	1253	1267	530		
1318	7734	4595	1140								
	7673	4596	1157								
1319	7625	4597	1180	1250	1253	570	1383	1387	753		
	7606	4598	1180	1263	1273	610	1373	1387	757		
1320	7594	4599	1150	1253	1263	597	1370	1383	710		
	7565	4600	1150	1273	1287	613	1397	1413	710		
1321	7721	4601	1150	1250	1257	583	1377	1390	677		
	7698	4602	1187	1290	1303	643	1397	1417	677		
1323	7626	4603	1187	1240	1250	583	1373	1387	653		
	7598	4604	1069	1230	1240	580	1380	1393	697		
1324	7693	4605	1153	1230	1243	533	1393	1407	727		
	7665	4606	1190	1227	1237	583	1392	1400	727		

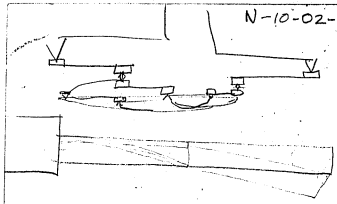
1322	267D	7481	4670	1133		1247	1253	507		
		7473	4671	1147		1267	1277	540		
1325	261D	7471	4672	1153		1273	1283	477		
		7468	4673	1153		1247	1273	443		
1326	270D	7488	4674	1157		1250	1257	403		
		7521	4675	1143		1287	1300	517		
1327	265D	7503	4676	1159		1310	1320	607		
		7446	4677	1167		1283	1297	567		
1328	262D	7548	4678	1153		1280	1287	597	1297	
Some clouds predicted		7419	4679	1150		1257	1267	573	1290	
1329	265D	7594	4680	1130		1233	1250	493	1290	
		7496	4681	1127		1253	1260	457	1290	
1330	273D	7507	4698	1123		1240	1250	483		
		7492	4699	1120		1243	1253	513		
1334	267D	7490	4700	1117		1223	1240	463		
		7463	4701	1100		1217	1223	460		

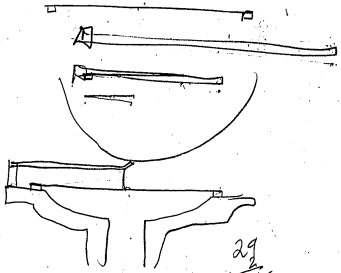
	4968	1100					1283
	4969	1117					1307
							1004
	4970	1140	1260	1267	407		1317
	4971	1133	1287	1297	427		1313
	4972	1127	1273	1290	427		1310
	4973	1153	1267	1277	270		1353
	4937	1073	1157				
grass clearing, old stick of wiring — up	4938	1100	1157				
	4939	1093	1247				
	4940	1073	1157				
	4941	1100	1173	1267	470		
	4942	1100	1247	1277	423		
	4943	1093	1190				
	4944	1117	1190				
	4945	1090	1277				
	4946	1113	1260				
	4947	1107	1033				
	4948	1100	1133				

Notebook, N-10-02-11

This notebook covers the period February-April 1910. All entries are by Edison. It is the first of three books that contain notes and drawings regarding the development of phonograph recording and reproducing apparatus. A notation in the second book indicates that much of this work was conducted at Edison's laboratory at Fort Myers, Florida. In an entry dated April 9, 1910, Edison notes that "the talking is the clearest & best I have ever heard on the phonograph Bar none" and that "this is the Recorder par excellanc to work with—." Several entries indicate the involvement of Alexander N. Pierman and Frederick P. Ott. At the end of the book are cost calculations for storage batteries and for cement production. The front cover is marked "Phonograph No 1 Feb. Mch. April. 1910." The pages are unnumbered. Approximately 160 pages have been used.

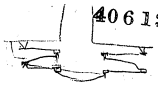
N-10-02-11

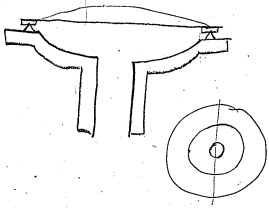




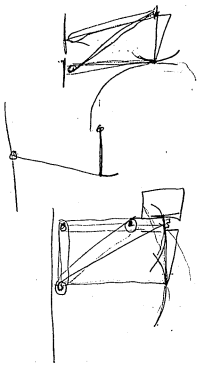
Rome Co.,
MFG. STATIONERS,
69 FULTON STREET,
NEW YORK.

40618

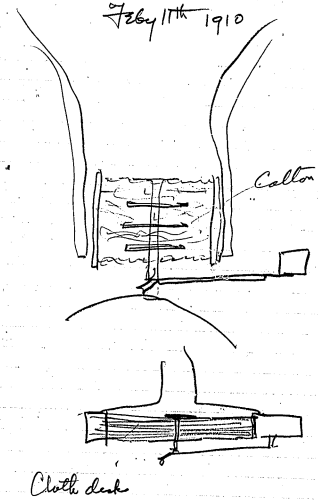




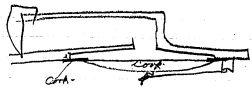
29
54

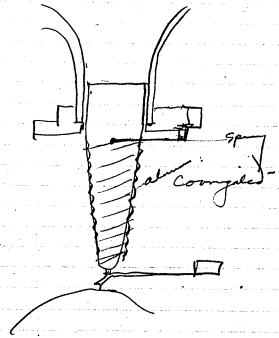


Feby 17th 1910

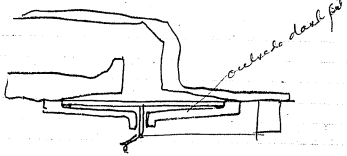


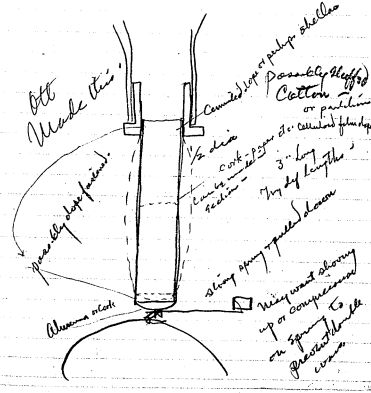
February 11 1910



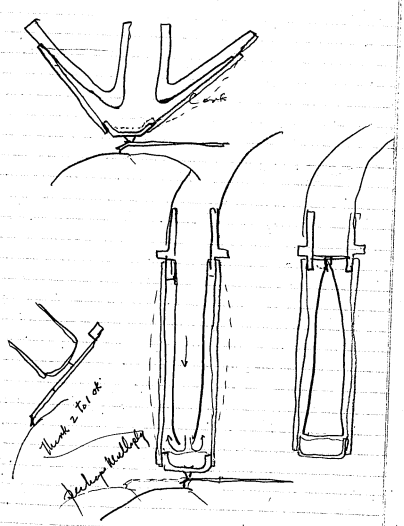


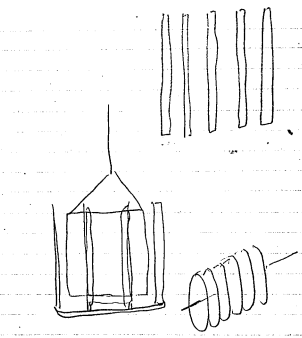
February 11 1910





Feby 11 1910





February 11 1910

Tube diaphram

165
62
330
9900
102 8

102
30
72

62 | 72 (1.16
62
120
120
58

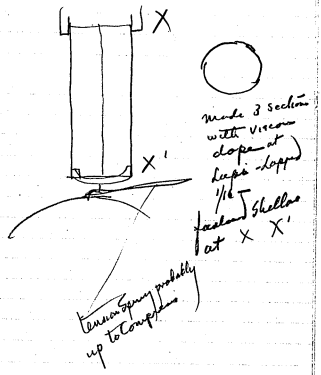
8500
10200
12480
304
5

120 lbs

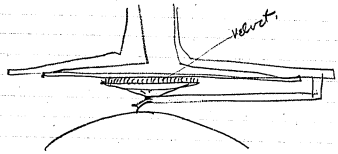
446
120
892
446
53520 | 244
244
1000 | 21480
20000
1480
1400
80
80
14

62
220
124

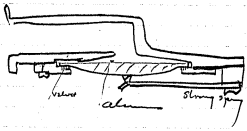
Feby 11 1910

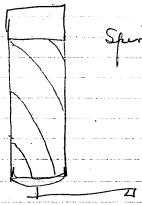

X
X'
Made 3 sections with visceum slopes at lapis slopes 1/16
Fasten Shellac at X X'
Tension Spring probably up to complete

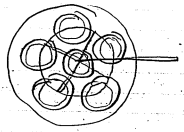
Feby 11 1910

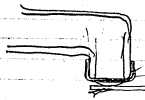


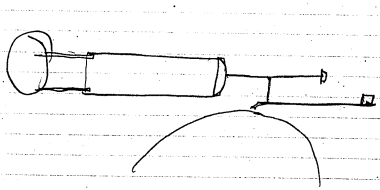
Feby 11 1910

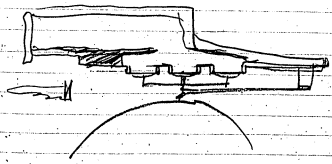


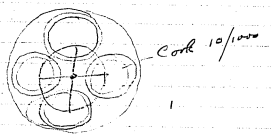


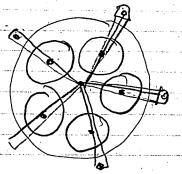


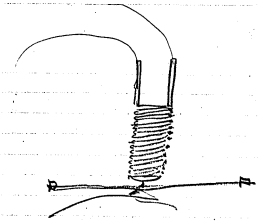


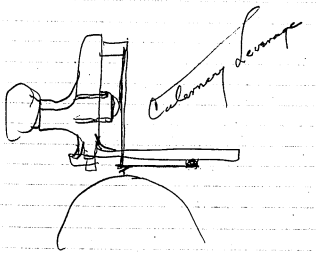


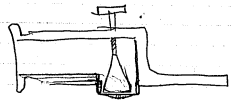



Cork 10/100

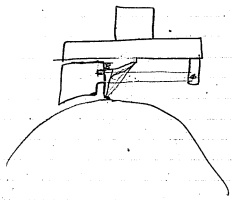


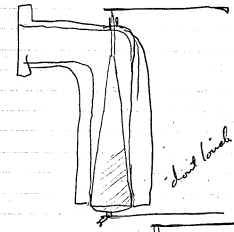


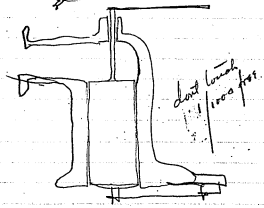

Calomey Lemmy



Try one of good recorders
& work the rubber connector
on funnel & stand with
end to end so rubber cant
vibrate or leave an enlarged
cavity
as stud cup is fixed make a
fit on a taper -




dust brush


dust brush
1000 fps

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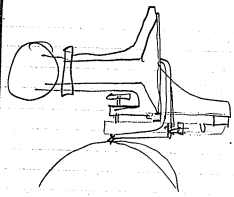
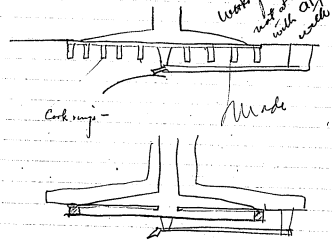
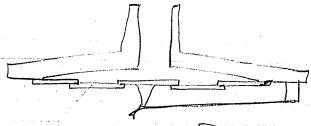
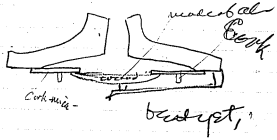


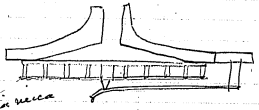
Works good with Cork
not at all ⊕ in conjunction
with Alfalfa
with Line





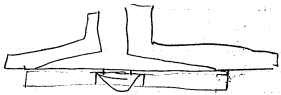
Cork-Rings - drop around Edges -

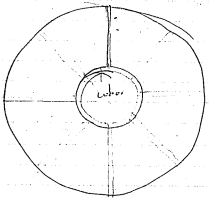




2 dia wooden
Cork rings in
between

must be 1/32 notch here to insure
right diameter of <u>piece</u> dropping + not
irregular dope edge as now -





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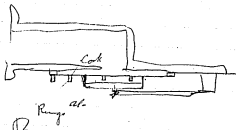
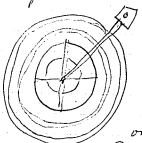

Cock

Best yet,

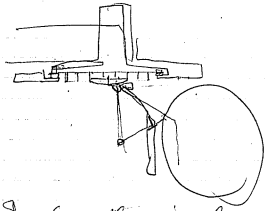


loud + no doubles on low or high, or saw specks.

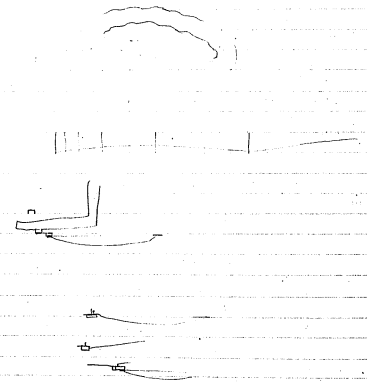
small fair. Base rattles low

Reproducer must be improved as some heads work far better than others, some seem quite flutters & doubles others OK

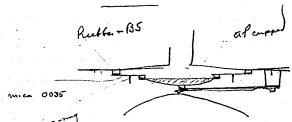
Showing lot trouble in Replay



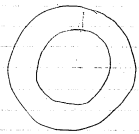
Spacers with rings – of
Celluloid – also cork
~~[illegible]~~ Celluloid disk also mica.
003 + cork rings – al. rings for
knife heads



Feby 27 1910

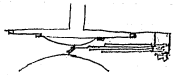


Dowels to wall
Ring dimples
amplitude



Schemes for limiting large vibrations without damaging adjustment of small vibration

No 1



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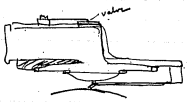

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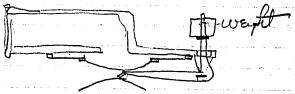

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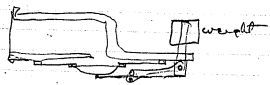

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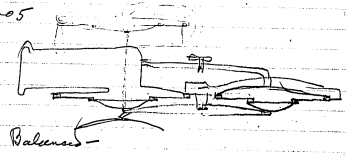

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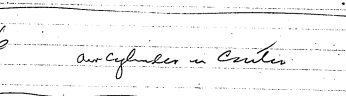

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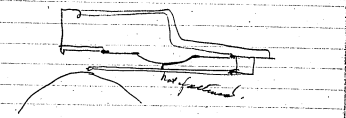
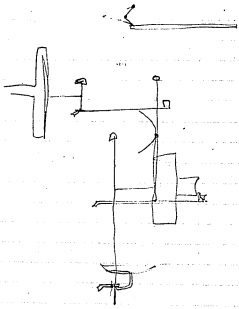
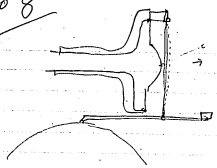


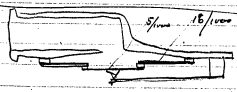


No 8

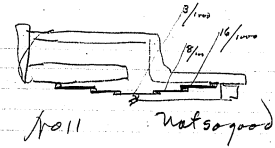


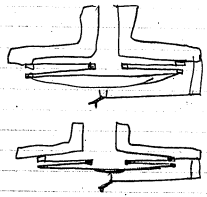
No 9

Mica Disc



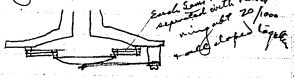
No 10


3/inch
16/inch
18/inch
Nail
Notsogood



March 8 1910

Best so far —



3 mm dia 5/000 thick sink total
15/000 + yet to loud — most of our
dies — Piano is loud + yet drowns out
show any sign of jump out —
Pianoman high note loud enough
do not jump out although it
hopped very much over each other
This Recorder is the most sensitive
Compound to the tenor the gave
loud record without jumping
that we have now loud —
Quality good —

The first Experiment we
used 3 3/000 dia it was
very loud for piano but
had false sounds due to
buckling + reaction of
our diaphragm on the Ebb
other yet on Pianoman

loud high note deduct
jump — it was high water
mark in this respect
Could we succeed in
using the 3 3/1000 we
would have nearly all
that is desired — possibly
we can stop cavities
by filling in the 20/1000
space between ring diaphr.
by Cotton or other material

One peculiarity in Ch
dia is that with 003
ring dia. The Talking is
not sharp but clear
but on other hand the
Piano is rich especially
the bass which is perfect
rich & loud high notes
not sharp enough —
We believe Records for Piano
Xylophone etc where sound
is sudden should have
this property wherever

in talking or vocal
it should be very much
sharper + 2 kinds of
recorders will be necessary

against the use of 3 .005 dia
would make them heavy
but by use of the .006
aluminum central disc
not flexing we lighten
very much - this can be
carried further + possibly
.003 wire can be used
by keeping whole disc
of diaphragm same but make
the center at from 7/8"
to 1 inch dia - this would
~~that~~ not lighten in case
of .003 but would in case
of .005 - but the .003
would probably get
nearly if not free of
buckles —

The problem is to use .003
+ get free from buckles +

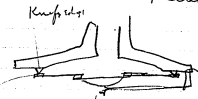
sharpen high notes which may be possible with Collar or by thinning inward the Knife spring —

I tried the Tri diaphm device with the 3 semi diaphs separated by papers made of rubber + stiff dope but the sound was lower than if a 12/1000 dia was used. — very sharp. It shows that the Tri Dia should act like a multiple leaf spring ie the edge of the inner under be free to move — also the 3 semi diaphs did not swing from the same Center + thus caused inner binding —

I am now trying a single ring dia 10/1000 but with outer edge resting on a Knife edge

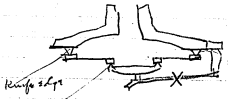
Then

March 8 1910 Best up to date



Rubber ring cemented to ring dia of Mica

This should make diaphram more sensitive if this works will do same, leaving on non flexing dia thus



No 2

Bowing X inward to seal air tight =

This should be good for Repairs

This is fine just bored to pressure inward to diaphram light no leak Round fine no flaws - 10/Dec Dia family bowl inward & broken more colorate, see Pg 7 No 2

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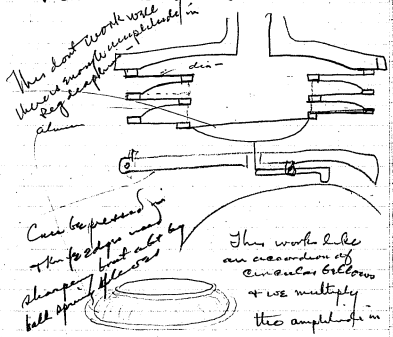
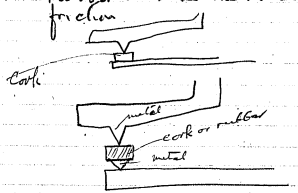
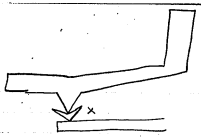
What appears to be necessary in a Reproducer to allow increased leverage & louder sounds to be reproduced is to diminish restriction of amplitude of the diaphragm I am making this.



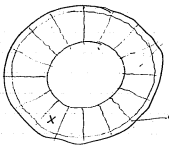
It is probably much better to sharpen the sound of the record by a stronger knife spring bowed in from to obtain the same result by thickening the diaphram between in holes. Case you add to weight or diminish amplitude — whereas with the knife the same sharpening is obtained without any limitation to amplitude —

Think that possibly Cork might be better than Rubber as less internal friction





possibly no cork or rubber at
all x being metal —
Oh no No — one on me —



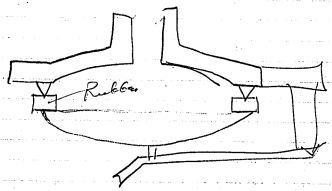
X Mica Sections cemented by shellac on
metallic ring - .003

Sections do not quite butt - filled in slots
with Cardolite or rubber cement
.003 slot, total leak 40/second

Mch 8 1910

This gives due of great amplitude & sharpness attained by outside knife opening or Extra Spring to balance wt of Sprinkler —

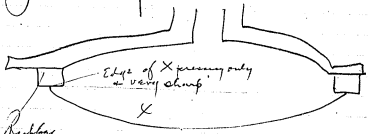
Possibly a non flexing design could be used also



By forming in the knife opening could get required amplitude with Rubber duplicating at knife & Early Pay

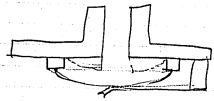
March 8 1910

Possibly this



probably much deeper
would be better as much lighter
& less work to do on rubber
Even cork might work if edge
sharp enough

Chamber might be this



March 8 1910

I now know that the reason we never could amplify the sound to any great extent by leverage no matter how hard the record is because the range of playing in the D. machine has been ridiculously too small — no ordinary design will permit it — plate 13X shows an arrangement which makes amplification by leverage possible.

One of the hardest problems yet to be solved is to get the repeating ball to track in the middle of the record, on strong records ~~that~~ where one groove cuts into the other there is also ~~[illegible]~~ pounding produced by ball always travelling on the side not always but generally

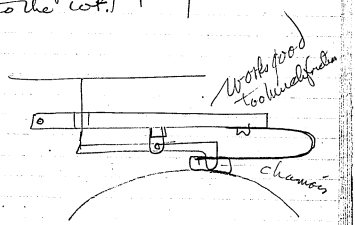
March 8 1910

One solution is to use a brush of hog bristles connected to the weight the bristles running in normal grooves of recipro shoned track the ~~[illegible]~~ weight always hung at central then the Spdaker ball would be central in case of 200 thread 50 threads would be covered by the bristles - probably a Chamois skin pad could be used instead

In fact the weight could be semi floating + doubled in weight 1/2 of the weight taken on the chamois + the other by the ball which would be same wt as now but the extra wt taken by the chamois or bristles would tend to stop rattling + do same thing as doubling the wt without having it all on the ball +

March 8 1910

on the chamois could be put on a flexing spring (mounted to the lot.)



Possibly Rubber could be used but that friction too much —

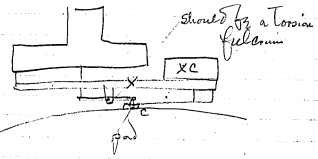
to track possibly must be an adjustment to track right by eye then it should not require any further adjustment

flexing of ¼" on chamois spring would be enough

16-3
143
2
63
181
12000
108
16

Mch 9 1910

Good –



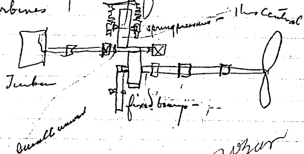
balance weight of lever X 6 oz
Spring + pad resting on second
so no weight pressure on rupder
point rear and add $1\frac{1}{2}$ oz to XC
this will give $1\frac{1}{2}$ oz pressure
on rupder ball but when
recoil return takes place we
have of X was originally
$1\frac{1}{2}$ oz we have for inertia
3 oz instead of $1\frac{1}{2}$ yet
there is only $1\frac{1}{2}$ pressure on ball
this represents weight jumping
on load recoiling –
This can be carried still
further – + some time it

Mch 9 1910

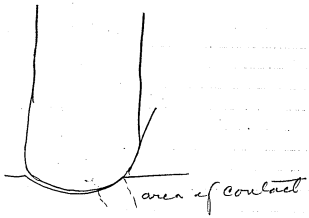
the pad feeds the lever right a
stops side pressure of ball
which can be adjusted
central in the track

If the later is not required
a wheel could be used for
Even on a weakly geared
phono a pound of weight
could be used for inertia
wheel??

Reduction gearing for Steamboat
Turbines



Too much power wasted



1

12/16 — 1.15 10
6/16 3/4 5 =

24
2

March 9 1910

X is the polished truck of Reproducer ball on Loud records on Reg white Record wax 2½ oz weight — I cannot quite see why this always acts sideways Especially when Record is Dupled on an Equal duplicating machine to Recorder

March 9 1910

We are just tried the double
Knife edge & this the best yet
Every vibration perfect & louder
than with single knife edge
on the outer edges — overtones
better & also bass 10/1000 dec

Knife spring bowed in just
Enough to seal chamber
by forcing knife edge into
rubber —

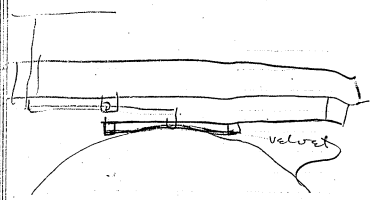
No jump out on Piano
hard scale & piano record
hardly noticeable Not with
a whole of jump out
showing that the more
perfect you get the nearer
Microphone the less
Compression to the Eye is
the record indeed & at same
time the record really gets
louder this proves
apparently that these
big indexes are false &
due to buckles etc

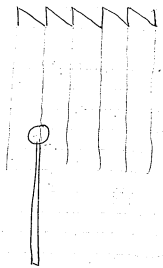
March 9 1910

This experiment shows that Gossing in is a good trick as the way vibrates in one direction & increases in power required to flex vibrates in the other direction & thus demonstrates tendency for knife to leave the way

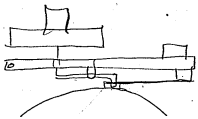
just tried 6½/1000 Mica diaper with double knife shape the louder but has few false waves – not preferable to 10/1000 No jump out on piccolo & loud notes & piano works small –

We are going to try Experiment of Double knife edges & Mica without Rubber using Castor oil to make a film to stop microscopic leakage





Mch 9 1910 -

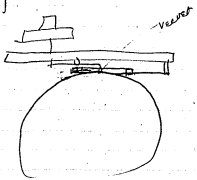


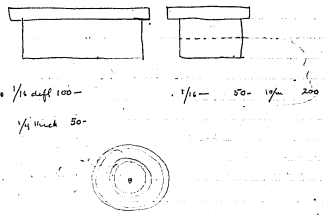
pad -

Def. input instead of pad use a wheel of disks - 20 of them loose on shaft so each can run in grooves

use comb of 5 spring prongs each with sapphire ball on

Velvet pad -



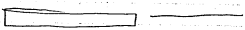


Mch 9 1910

It is possible that if 1/4" deep groove was used one 1st point of record + the weight was unwinded for Guide movement Except from a friction that the ball running on the deep track would overcome the friction & start right for whole record providing the Exp and on & Contraction of record was OK –

It is very desirable to make the diaphragm as light as possible to get quickness or sensitiveness & at same time sensitiveness WE now have 1.5" diam diaphragm 10/1000 thick which is ok ~~[illegible]~~ Weight say 100 % Resistance 100 %. If we 1/2 the diameter, using 10/1000 we reduce cost to 25 % – + have Resistance 100 % as here is 1/2 length. 1/2 as many of them ~~[illegible]~~ which equals, but area is 4 times less, hence must flex 4 times as much + thus takes twice power

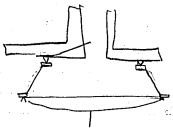
2" dia -
½ D 4 times less wave leverage
if ½ the length of lever. 4 times power get same amplitude — hence have 8 times for ½ dia —
If lever reduced to ½ thickness there is flower in a square of depth then reduces to 4 times, if reduced again to ¼ — same as above —
So 1½ dia 10/1000 — then 3/4 dia - 2½/1000 makes same amplitude with same air leverage & power as before —
but weight will be ½ dia 4 times
¼ thickness 4 "
Total 8 times less wt

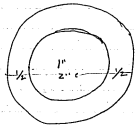


Mch 9 1910

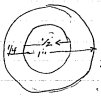
hence dia must be 2" 4 times thinner
& thick - if 2½/1000 - it will weigh 16 times less

Mch 10 1910

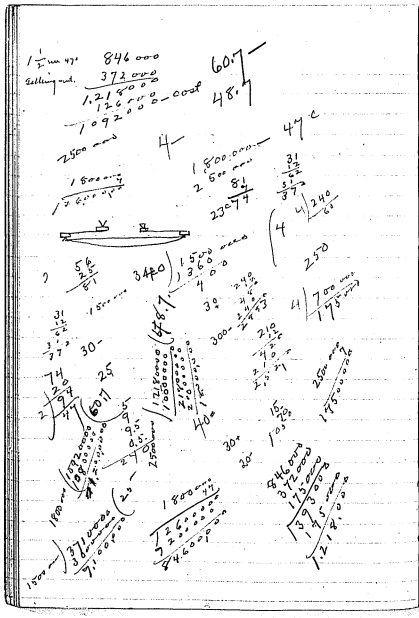




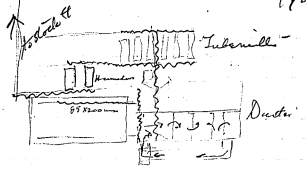
limit flexp 3"
weigh 400 -



limit flexp 1½
2 dia " 3 -
3/4 weight

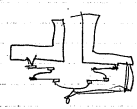


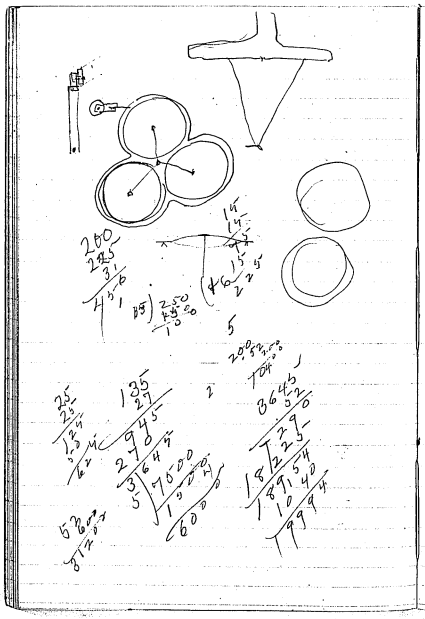
Cement Mach 10 1910



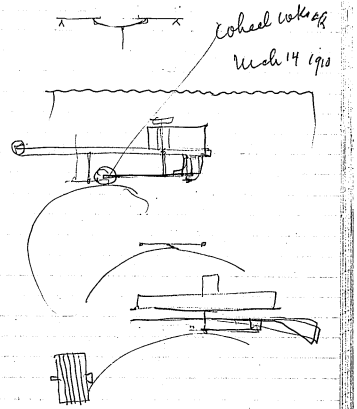
1½ million 56 Cents - Sell 25 total 81.c
bags deducted 74 Cents

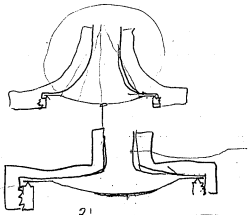
3 million 27c Extra no selling exp - Ten profit
makes 20 0 Cost, Total Cost 47c
Sold,

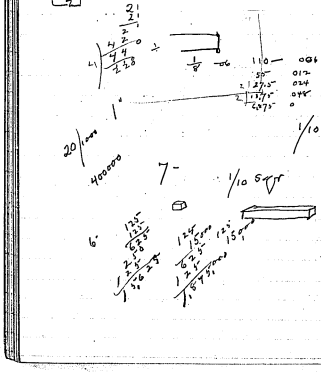




Mahio 1910

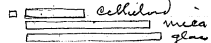


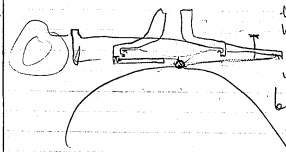




March 11 1910

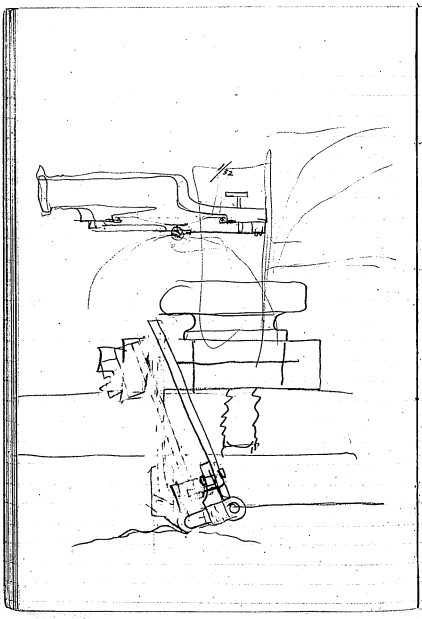
006- Celluloid 21/64 equivalent to 1/10 inch square & 7/8 long
of mica equivalent to 1/10 sqr 1 3/4 long

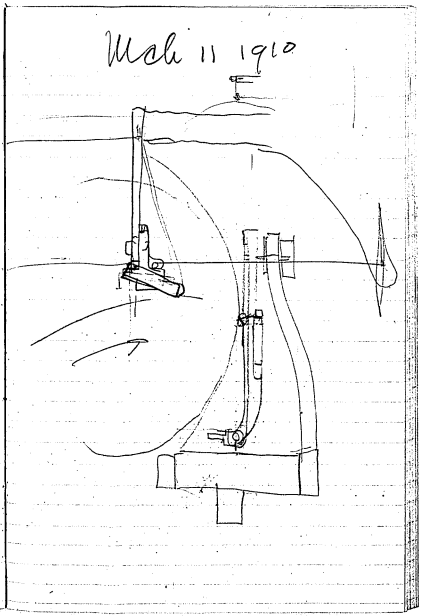


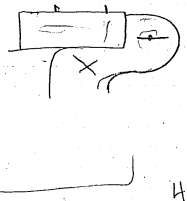


Wheatstone has commutator margin even with stiff spring but think it dangerous to Records.

hands public without some [illegible] on adjustment.


1/32


March 11 1910



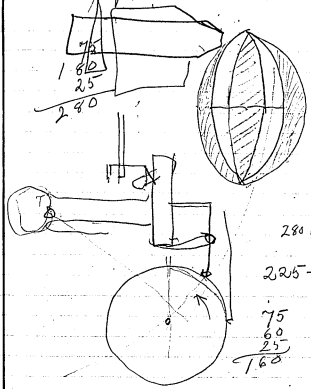
240 | 1.44 | 4.8

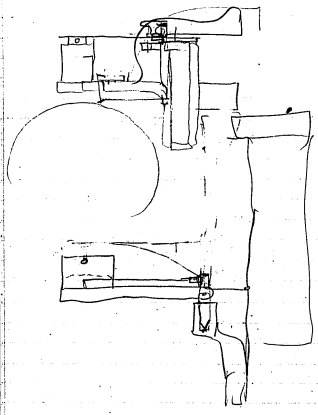
1500
960
19

15
16
90
30
144

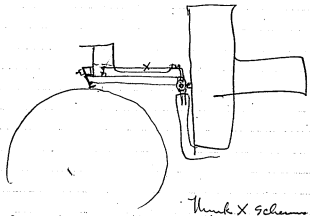
4.8
191
36 lbs

March 13 1910





March 14 1910

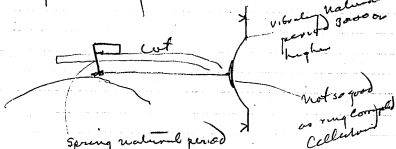


think X Schum belts
then wheel —
X Counterabling operating
3/4 of pressure direct to LOP
Taken off replace point
+ at same time put 4 turns
the LOP for working all
swinging on same center
with lever to diagram —
so track good

I think our diagram wrong
parts heavy always ~~been~~
too heavy + that we have
not had enough light throttling
periods enough

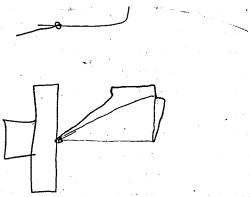
March 14 1910

By Drapin of paper possibly a baked shellac



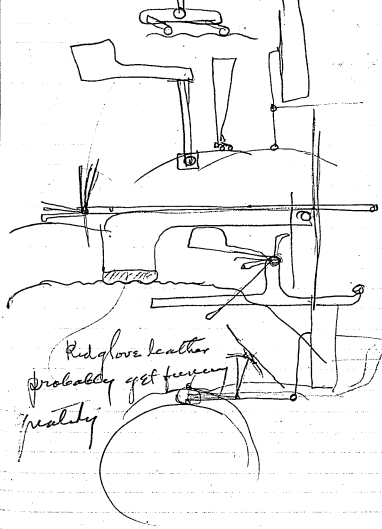
Weight 1 mm wing Dia 80 milg
Spring 60
wire 5
145 "

This should follow track truly -

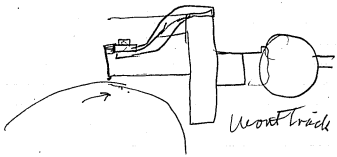


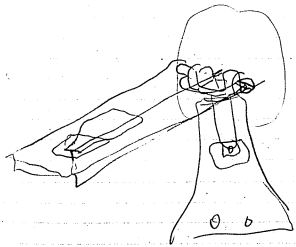
F

March 14 1910



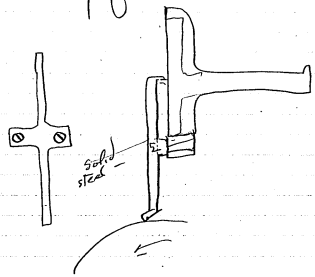
March 14 1910





March 16 1910

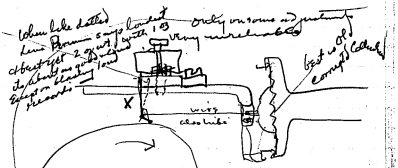
Tried if the lever of Reppler ~~[illegible]~~ wedge ~~[illegible]~~ the wooden foot to transmit heavy like tuning fork



Did not work accurately heard shows that must be a fulcrum or Rock —

Model
Keep —

March 16 1910



Cellulod 006
arched only
1/4 flat for
flexing —
on Knife Edge

Loudest we ever had
with 2 oz + quod.
but it will not give clear notes on "Wrapping" on land part
no matter how much weight.

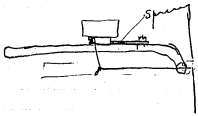
With 1 oz OK on weaker
Records + which it moves
Ours doubles Volumn
Round —

Had X strung at first, got louder
+ louder as we thinned it down
more + more — after 1 oz
adding weight dont increase
loudness but makes quality
better — stops flutter + rattles —

March 16 1910

shellacing the wire from lever to
Dia at loose joints dont seem
to make it any better,
putting in steel tube .0035
bottom, + shellacked

March 17 1910



Mounting fulcrum of wedge lever
on a stiff spring $\frac{1}{32}$ by 3/16 wide
It gives with no weight on end
spring Valve 1/3 of best + little
lower Chart Reg Regular
but it is perfect, showing that
it tracks ok - out of lever 1 oz
hence a spring mounted
fulcrum with 1 oz pressure
makes record perfect

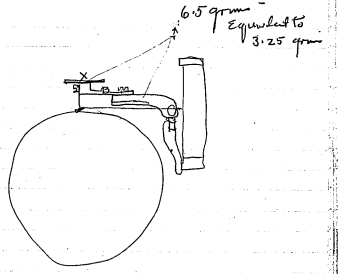
now if 3 gram head Gs fastened
by cord at end of spring lever
the Volume is doubled & is
louder than Reg receiver
by pulling it thus

So weight about 1/3 of 1 oz tracks
perfect + very little dif in
loudness —
This shows that we shall be
able to reduce weight
greatly + get big Volume by
diminishing + concentrating
the weight at fulcrum of
working lever, + then to
prevent rattle lighten the diaphr
+ increase the fulcrum at
same time + make the non
flexing part so no flexing at
all —

3 x 9.

" 9

Theoretically there would be no fluttering on low notes if the weight was fixed & dis-charge, but owing to sluggishness of low notes the weight has time to move whereas high notes it has not, so the weights must be enough to take care of the bass notes the highs will take care of themselves



6.5 grms only chops tops of strong noted Can hear high notes ok + good amount fluttering of strong notes. added on X 16 grms, made it louder than Reg Reeder but still some flutters on heavy waves, — added 9 more didn't stop flutter but quite louder took off the 9 & added on X This was just as loud but flutters less,

3.5
4.5
16
24.0

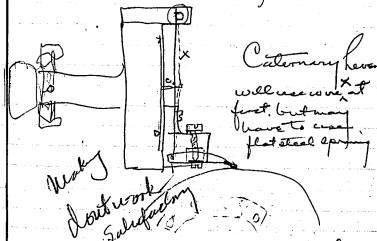
24 grms press made it much louder than Reg but flutters on heavy notes

It looks as if the lever (10) reg
should have a certain pressure
say 6/10 oz + then the wt
added at X can be balanced
nearly + not add pressure to
ball but act purely by
inertia
or perhaps the lever should press
down the ball by spring pressure
+ not by weight + a wt added at
X to give inertia – it dont seem
to want much weight for inertia

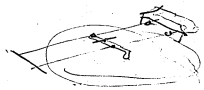
March 24 1910

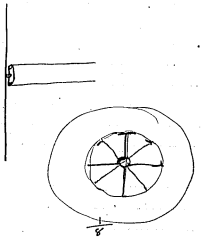
made dia Cellulose

but it flows all over
probably should be deeper or
not have the Corrugations in

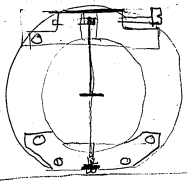


Idea on Surface gages like
Trescodes then use bridge
& but of like Reader use
link —

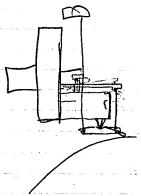




Mch 24 1910

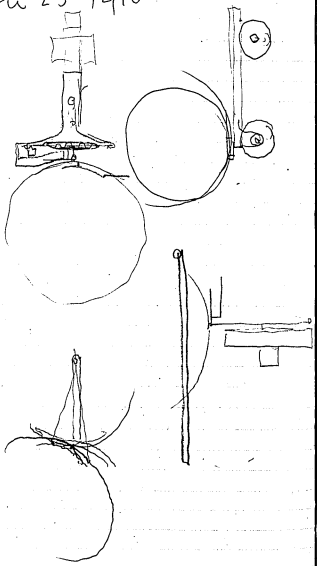


Catenary —

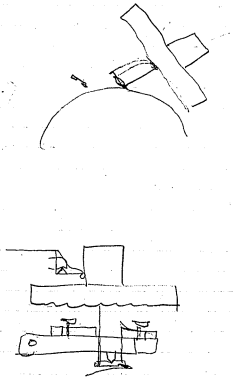


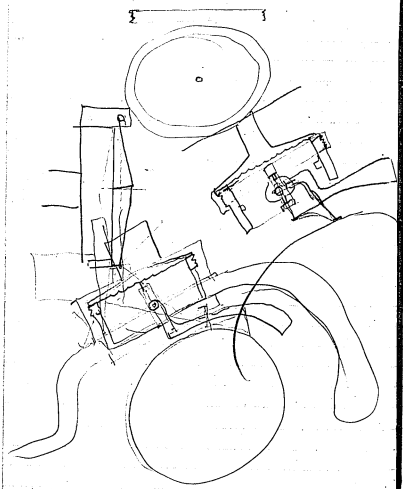
Spotwork
Schrafirung

March 25 1910

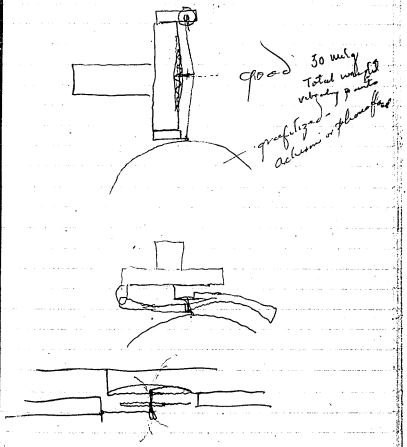


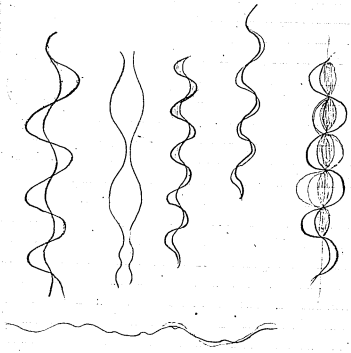
March 24 1910



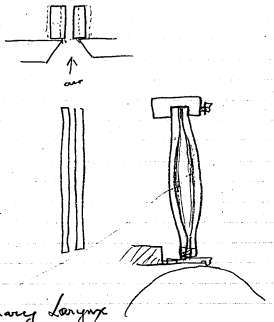


Mch 25. 1910



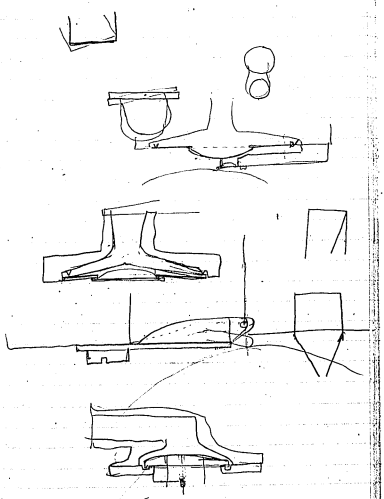


March 25 1918



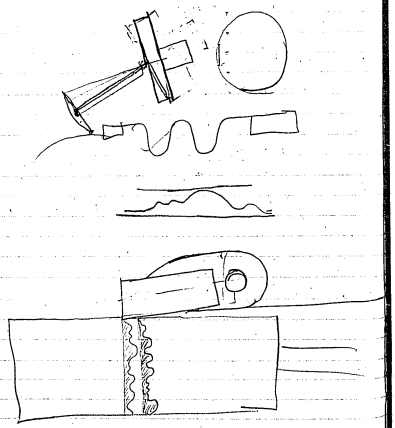
Catenary Larynx
for air phone –

Mch 25 1910

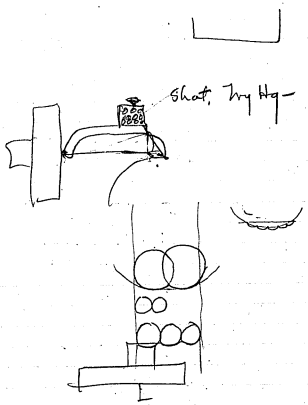


Vaseline
or oil?

Mch 26 1910

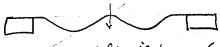


Mch 26 1910



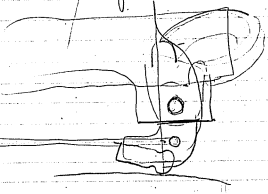
March 26 1910

If you pass 45 deg in elsewhere I think the die will become very flex for nephews

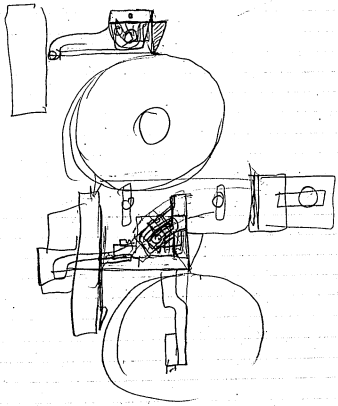


not flexible to any extent

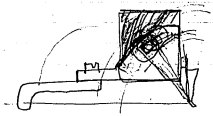
quite flex

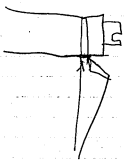


March 27 1910



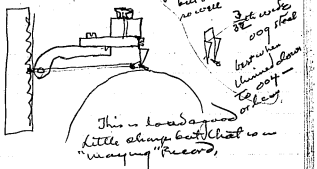
March 29 1910



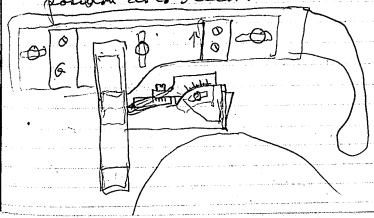


April 1 1910

We are gradually getting to the good reciprocating —



We are now making a reciprocating with indexes to determine angles — length of rotating lever, weight & position onto screw —



64) 1050 (16
64
470
464
6

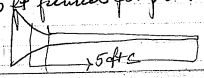
256 (1050 (

2) 256
128
64

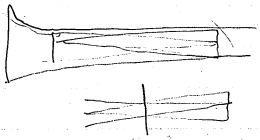
Apl 1 1910

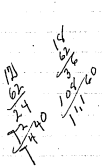
This device can adjust vibrator levers to & from the Dia also at any angle & also put in levers of various lengths — The whole apparatus can be adjusted up & down in relation to Record — to & from the Center of the same

It looks very much as if the recording funnel should be a little longer as long as the wave to be recorded - (10) 256 vib should have funnel 2 feet & so on as piano mostly 100 as lowest used — 5 ft funnel for piano

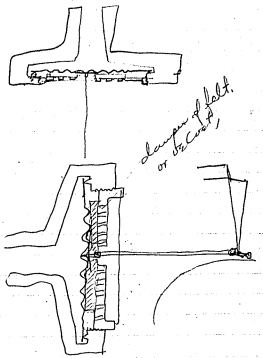


If shorter funnel used
a part of the wave loses
its pressure outside &
there is deadwater





April 2 1910



72 to pay out

65

850

1350

20

1400

59 - average 27000

1350

270

1080

21,6

1400

560

560

560

61,600

65 -

72

60

432

216

63

59

200

5600

64

300

60

1800

1080000

200

1000

850

200

56

292 -

30

1500

450

270 000 bricks

104 000 ready mate

188 000 open

292

750

112

16

56

72

65

45000

4000 -

1500 000

1320 000000

1320 000000

1320 000000

9000000

16

20000 -

1500 000

20000000

1500000

5000000

1

11000

4000

4000

4000

1500

75

300

1050

12,500

9000 - loss

April 4 1910

190,000

73,000

253000

80,000

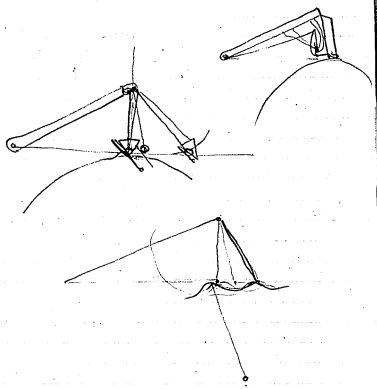
373,000

150000

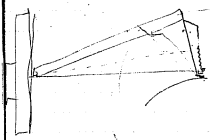
125000

finger pad

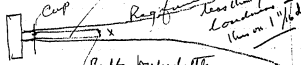
April 4 1910



Apl 4 1910



Doesn't go good,
3/16 combination at
outlet of Cavity is
little thin 1/32 5/16
Reg. fine less than 3/16 diameter
Lowering Throat 1 11/16 dia

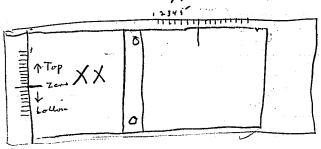


open at X $\frac{1}{4}$ inch same as Cup.
Then tube induces scratch sounds
& mellows the Quality of Cup
but apparently non periodic
large movements of diaphragm
only had it 2" long which by
all variations Then tube is put
on Cup underneath & Well
fastened by a brass ring
Hereafter I shall get an
adjusting screw so public can
alter Volume equally

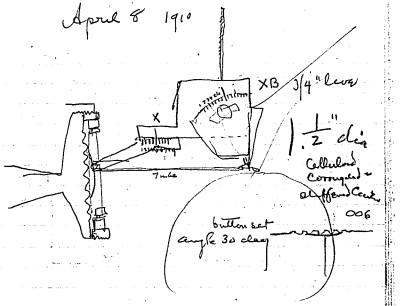
Apl 8 1910

A Tandendying Reproducer
with Indexes

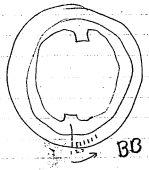
XN



April 8 1910



X Index from left 1 2 3 etc
XB " " 1 2 3 etc



Apl 8 1910

Standard Reader -

Just as it comes from shop it is very loud a Victor Herbert is 4 times louder than on Reg all say its more mellow - Some of reg 2 min bands are harsh & chattering up but these are all both jumped out. New recorder used on piano very mellow, Record best from Orange from Big Piano louder & more brilliant full doubles - Mina unanimously said records were better on 2 oz Wheat 1 1/4 This couldn't detect it a little bass (deep) that chatters & extra weight stops it more or less - these faster sounds are wiped out to Mina when she diminishes the volume by putting finger in Ear but not when volume is reduced by crowding handkerchief in funnel There is no doubt but new recorder is very mellow, perhaps too mellow but this can be stopped by thicker disc or more tension on spring - On Standard R piano here is recorded & reproduced perfect equally as piano sounds which

Apl 8 1910

is a poor one & weak

All above is on

Index X	2 1/2		Weight 1 1/4 oz
" XB	7 1/2		for fixed weight
" XX	1 Top		ok on this with
" XN	10		our piano & new recorder
" BB	Zero		

With above index - I am sure all kinds of records of taken with new Recorder will be fine & 4 times louder than Regular with 1 1/4 oz weight total -

Moving index BB 1 to right this looks dis little but think it will act itself - dont exactly know dis but tube may have latitude enough to take care of considerable movement of BB my 1 to right certainly makes it louder.

Now 2 to right

No better probably 1 is ok + improvement

Apl 8 1910

Tried BB 2 on piccolo — yell.
then No 1. No 1 Best — We adopt
this as standard —

Rose Mexico

XN — we now make 11 deg
No louder — imagine better,
imagine better yet loudness apparently
same 13 degrees. same loud
quality of 12 13 & 14 some around not
much scratch, bones sharp & clear
14 — imagine little less loud
& perhaps quality not so good
on loud finish — 15 — about the
same — I now take a jump of 3
to 18 — it less loud but its
sharper. So this is a way to get
sharpness — Back to 16, this
is 50% louder than 18, more
mellow but not clean so far
about 13 @ 13 the best for quality
& cleanness without any
appreciable loss of volume
~~Now we~~ put it at 13

Apl 9 1910

No 10 on this index is the
Center of recorder We now
go the other way 10 to 18
to part the Center, Now we
go this side to 8
found it about as loud but
Rattles, our big notes NG

With the original adjustments
13 to 15 is the best on XN.

We now go on Index X which is
2½ now it on all previous tests
we set at 1. No good whizz
& not so loud don't follow track
Now set at 3, imagine the noise
so loud as 2½ its sharper —
~~Just~~ now set 4. Little less loud
but very sharp, more like phone
tone This is a fine way to
get sharpness, 2½ is
best for Mellow Controlls —

2½ best — put it back to that

Apl 8 1910

We now work Index XB it sounds
7½ — we now go to 6 —
not quite so loud & too sharp
we now go to 4 = about same
little sharp now to 2 =
not good — mushy —
We now go the other way
from original 7½ to 9 —
Loud ok sharp no mush on
base — now 12 = now 11 scant
loud — sharp its good but
would like to have it more
mellow — Cant give it more
as clamp strikes, if its sharp
but probably record is sharp
& that new Recorder which is
too mellow will be just
right

All previous Experiments
on 3/4 inch Vibrating lever

Inch lever
Apl 8 1910

We now have
BB 1 on index
X 2½
XX 4, Top same as
previous XN 13
XB 11
We now put in 1 inch
lever —

a preliminary trial when XB at 4
is loud but not good on Mexicos
Burn on Herbert —
Now set at 11 (to) XB Loud
very = has a ring = we now make
X 3½ weaker — 2½ to lighten
link as longer
& spring is weaker by leverage
3½ very loud thunk & louder
than 3/4 inch lever
Oth Sings big bass at end don't rattle
Its good on Herbert Flutters, but
makes some defects we go to
XB 14 — & Cant do it —
We quit on it with XB at 11 & X at 3½
as only change — Its loud & good at this

Apl 8 1910

but want it more musical on heavy
Clash bass and more at 4 more
perfection on Herbert of Cathedral —
~~the 1/2 lever could be~~
~~better~~ —
As far as I can judge the
3/4 lever is better & preferable
tonally as sound
therefore so far 3/4 lever is it,

Now for 1/2 mel lever

X set at .1. instead of 2 1/2 as
lever is now stiffer this to start
with, Ott says no illusion on disc
must come to 3. Waltke has probably
made the hook longer & this throws
out X index —
Its very sharp + not as loud as
3/4" about 75% of the loudness
but still very loud - best tumbling
sharp not dry mellow - but it
evidently brings out every note clear
+ absolutely no rattle on big bass
at end mezzo with a mellow Melaxolo
this should work fine — No doubt
if the spring at clamp was thinner

Apl 8 1910

or better 5/1000 stock spring steel
instead of 9/1000 it
would have sound difference as
9/1000 on 1 mel lever + 62 very
musical lighter. There is no
use pulling off more tension at
X as its too sharp now —
It brings out Herbert of Cathedral
perfect. Schumann fine would like it
little more mellow. its fairly loud
but no so loud as 3/4 &
with our new recorder piano record
Record is just as Mellow as ever
but not so good, piano no loud
is nearly perfect + on a new
record would be perfect,
but record is badly worn
altogether the 1/2 is not louder
Enough + while it reproduces
perfectly its too sharp —
Fred Ott is thinning it
down from 009 to 005 —
It makes it less sharp but there is
a whiz so fast sharp - its not quite
so bad I imagine —

Apl 5 1910

We put XN which is now at 13
put it at 12 to see if improves
it = Its more mellow & considerably
louder - Otl says it will vibrate on
loud notes, I now put it at
XN 11 - Louder best Otl says vibrates
on both loud & soft notes,
X is 3, but can't tell anything
about X on account Wood the making
hook longer - Horn Flat then must
be a working point on mouthpiece -
on all covers & therefore index
will be 11 — We put it at
4 = - Louder & probably as loud
as 3/4" Lower, but its opt whether
in 4 not good -

We not put back the 3/4 lower

XN 13.
XB 11
X 2½
Others same -

Apl 5 1910

It duplicates Exactly the first trial
Herbert's flatten funk -

I cant say if the 2 min seconds
I have here are dropped or spun.
They show wear the first time
over not wear but the clock
seems to be drawn forward in
the direction of retarding where it
goes up a steep hill - Yet the
weight is only 1 1/4 oz -
This shows that the weight is
not an index of the pressure
without these seconds are
dropped as I have run Herbert's
flatten more times than the
two 2 min & it shows no wear &
Entirely dif kind of surface
I think the Mouteau & Spun
& the others are dropped & soft.
Have run a Sousa band now 20
times, on loudest part which is
very big undulation cannot detect
but that it is as good as ever
but under Mueno its horrible
up hill drawn over the tape
all an industrial look it is unmovable

Apl 8 1910

How it reproduces yet it sounds as well as ever. It is slipped second & very soft —
We are running it still more
It is now getting a little jumbled
after 26 times, so 8th trip
after 33 I can scarcely notice anything = 40 trim. Took it off
doubt if public would notice much change but would say 40 was bent with 3/4 oz per 1¼ oz — for dropped wax

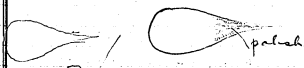
I think cog should put button in at angle 16 to 20 instead of 30 on 3/4 with another move XN from 13 to 12. This will increase loudness — Eggleston thumbs it bent =

Dieman turned off on 4 min. bent & recorded piano —
Could not track deep enough jumped out some but finally good little sharper than cobble

Apl 9 1910

wax & corrects somewhat the excessive mellowness of ring
Knife Edge recorder
Hz also gave his yell tone
This jumped out

Yet the 3/4 tests ~~[illegible]~~ standard
Replica reproduced it clearly
with 1¼ oz (12) no extra weight
run over yell 10 times.
It tracked absolutely central

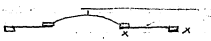


Can see no track on Extension
Evidently Mentor is going to be OK even on 4 minute record for wax with normal 1¼ oz. which will reproduce anything adding wt doesn't improve it appreciably — going slightly over the Center XN apparently was the great feature of improving & coming back to track —

8.

Apl 8 1910

Inertia in this armbend prevents record that while the yell was reproduced OK yet with more less prominent out there was doubles in the piano when chord struck These doubles are strange I now find that the Recorder used what the Natural is



X x rubber rings cemented this would account for the doubles --

Reproducers - 1 knife edge -
1 1/2 Ring dia double
Knife edge - on Study Reproducer 1/2 Ring
Sharp clear as a bell sound
& I hear no scratch at all
Pierman says there is very little
Dia 7 1/2/1000 - Al arch .005 -
" 47/64 - at knife edge

Apl 8 1910

Myers Piano - 1 1/2 Ring Recorder
Pierman says good quantity, very little scratch, I hear none, Pierman says Mellow, I think not very mellow
Valum good — yell OK
+ talking perfect, sharp clear, fine -

1 1/2 dia Ring Dia — 1/32 deep

Big in it some double quality to me better Valum better 25/10
7 1/2 Thick - Al arch 35/64 at Edge
This is the best of Can preserve quality + Valum + get no release on chords

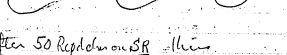
1 inch Dia - Valum 1/2 of 1 1/2
Sharp — Yell perfect of course
& thinner Dia cone 62 need
instead of 7 1/2/1000 + more
Valum Ele,

These results prove that the Ring Knife edge Recorder is a great improvement in the art

Apl 8 1913

Have increased spring pressure on
$1\frac{1}{2}$ Reeds to see if can get
Chord bug out.
It is now free from wing on Chords
at least you can only imagine a slight
amount in one strong chord. The
Volume is scarcely reduced 10%
+ Quality Mellow OK but not quite
so mellow as with lighter pressure
Pressure will put on a screw +
index to measure pressure,

Pressure Turned off a Moulan 4 min
+ Recorded Piano + yell –
the yell jumped forward



After 50 Repetitions on SR this

← way cylinder went

Apl 8 1913

X is narrow + looks exactly as shown it is
not deep + bottom is low its undoubtedly
due to ball going up N which it leans
in twice, winding up lever + disengaging when
it comes to top the momentum of the whole
carries it in the air + when it comes
down it makes X.

after few runs it about like No 1 the
longer you run the longer X gets
this is due to wear of N. The
clear air space or space between
record holes gets less + less. +
at first the ball lands in the next
hole ~~to~~ perhaps this theory isn't OK
that it starts at Edge of Hole at X
+ gradually wears a groove X which
is more likely =
The disruption of the wax at N
makes non periodic waves + results
in record ~~of~~ yell getting more noisy
a number of Repetitions increase

Apl 8 1910

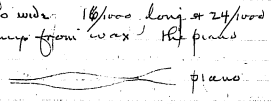
I feel sure this theory of starting of wear at round edge of hole in a jump out is correct and it will lengthen even if not jumped out but comes very near it on apex of a half the same place affords a starter to wear as it will certainly increase —
The flowing + tearing qualities of the wax should be such that the friction between balls wax should be insufficient to tear it or cause flow of material

Pin main 1½ if spring pressure increased it gives Volume ~~of~~ of 1 5/16 - but not so good. probably if more and pressure was used it would give more Volume & a longer life of 1 inch Reels + not be as good on account of momentum points = It looks like 1 5/16 or 1" for good results with thinner disc + less weight points to get quality + Volume but as far as can see 1½ 1 5/16 or 1

Apl 8 1910

with 7½/1000 - 1½ is best w/ a spring pressure is just sufficient to stop chord lobing —

In the Micro. on the piano Record on Montani run over 50 times not the slightest evidence of wear can be seen on piano wave although on the verge of jumping — they are long - 10 inches the yell has a high powerful note + about 13/1000 wide 16/1000 long + 24/1000 clear jump from wax. the piano



What starts the wear I think at edge of hole is that ball coming up previous hole drags wax out + after momentum ceases ball goes back to record with load of wax. This starts cutting back on the trail + longer the groove the coming up of previous hole is worn

Apl 8 1910

from this the conclusion is reached that a screw which strikes wooden so material is loosened or comes up vibrations the debris will start Cutting the balance of the screw

~~We are now making a~~ ~~Reed~~ which works better than the old and very Reeds + it will certainly not jump out —

Idea —

The weight jump right out here 1 or 2/1000 dia. bunched at angle 45° or thereabouts

Apl 8 1910

1½ Reed adjusting screw previous lightest can attend — Zero —
~~Also~~ Mellow loud but full ohing on loudest Chords —

1/4 turn more

Mellow. 20% less loud very fine on quiet but ohing on strong Cords ohing very high ~~pitch~~ pitch, Sand —

1/2 turn

Louder than 1/4 — Mellow, but has ohing a flutter on heavy Chords

3/4 turn —

Volume comes down so its not mellow + ohing not out a not as good as 1 5/16 —

So far 1 5/16 best + is greatly fine + loud enough + worst Ex. loud on Steinway grand at Lab next best is 1 inch

Apl 8 1910

I will put in a Thomas disc in 1 inch, 4½/1000 Mica - pretty good. Piermont thinks no one would want it louder in a house. It reproduces the Yell perfect & the piano is perfect but to me its not mellow enough & would like it louder tho however nearly as loud as Herbert's flatterer if not as loud -

My idea is that with a large disc say 2" you have a big range of amplitude, whereas with a small disc the range is small but in both cases at neutral point both are equally sensitive, the sensibility rapidly diminishes because the 1" disc reaches its limit four times quickly than a 2" hence ~~the 1"~~ will record a greater range of variations in volume without jumping out than a 2"

Theoretically the 1" should give a greater amplitude than

Apl 8 1910

2" as a given sound waves loses in leverage in a 2" & has more power & with 1" less power & more amplitude but is that multiplies this is that the elastic limit of the 1" is reached on small amplitudes whereas the 2" reaches a great amplitude before it reaches the limit but unfortunately in the meantime it permits the knife to jump the record -

What is needed is a 1" disc with a greater working amplitude then we would have maximum distortion by momentum & quickness

1" now with .006 Celluloid & Aluminum Center, Bury Celluloid pressure is as too light but it was loud & shows energy

Now increase pressure of knife spring sufficient to hold it on knife edges as it skipped before having scarcely any pressure think that Celluloid very

Apl 8 1910

Center is going to be the best + on 1" dia — + I also believe that the knife lever can be made lighter, with a longer elasticity as 1" dia have little power but great amplitude of the den pennis,

to have got pressure on Celluloid sufficient the knife was a wrong angle as had bow dia way down This shows great latitude of Celluloid + I know its best for Reporter + I believe it will be found best for Recorders or, an analogous material

I notice the dia slips around over knife edges I want a recess to hold it from slipping on edges P says it will make a buz I don't think so apparently he don't make it without orders. I think both the Center + outer Edge could have knife edges + recesses to stop slipping without any noise recorded

April 8 1910

P has now set his knife on 1" Celluloid - Ring Recorder He got too much pressure its lower in Nalum sharper but perfect I cannot see a single vibration by the Eye the record seems to be only tracked = 3 times over the yell cuts the up hill part, they are 13/1000 wide - not jumped the yell was skipped once perfect the 1st time over —

Tomorrow the 9th P will put on a knife & spring having more Elasticity & greater ranges of adjustment to be had,

I now have run over the piano record taken on 1 3/4 Ring dia described few pages back, for 15 times + there is still no signs of a clatter or chig on heavy Chords showing that when the dia is more sensitive or larger that these clatters + chigs on heavy Chords are actually

Apl 8 1910

recorded & are not due to the reproducer of a good one like SR now used —

Now the Clatter must be due to a superimposed wave due to momentum of the points, or 2nd to a buckle in the diaphram points, or the catching of the knife & causing wave to go deeper than usual so due to the sound wave.

We only get it on Pianos & it occurs when the record is no whiners near jumping out in fact has a weak appearance to the eye it occurs on heavy chords which jars everything in vicinity is felt on windows etc.

The moment we adjust for sweet Mellow & Volume this phenomenon occurs — They are possibly due to beats one between being out of time with the other. If this is so we should be able to stop them by turning the piano exactly. Then again they may be due to keys being struck too near simultaneously

Apl 8 1910

Notice that the scratch is gradually increasing & is very noticeable after 15 times the record shows bottom of groove is tearing & the up hills are showing plastic removal of stock. Don't notice any very apparent weakening of the Volume.

30 times over can't notice any clatter or whizz on strong chords Volume about same can't notice any difference. The scratch which is continuous is very much increased & quite noticeable when music is playing — ~~Apl~~

40 times over same Volume no clatter or whizz on chords. Continuous Crackles — bad — Quality seeming good — possibly crackles due to fuzz removed & plastered over the record.

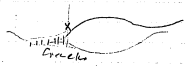
April 9 1910

Pierman on the Recorders cases a solid spring wire to be flattened.

This is too heavy & weighs more than the whole dolphin - especially the inch disc — going to make one like used on SRpder —

Using the Moulan Piano records Extra 54 grams on SR & running 40 times its easy to explain the tit.

Its due to friction drag cracking the Moulan



Soon the cracked X chips out, & then the Chipping Pro grooves —
The Clatter & Click gets less as Record wears showing that the Clatter & Click are not loudly recorded as is also proof by stuffing fingers in Ears when a smack diminution of volume wipes them out —

Apl 9 1910

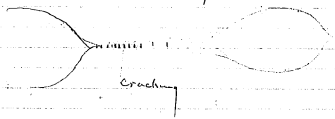
The pressure between a jump out hole must be very great as its only ½ to .003 wide & gets less wide as it leaves the up hill

Haloid Sing.

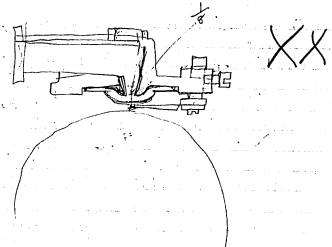
Shows diminution of pressure of Ball on wax as it goes to next hole

Jump out.

This shows it plainer



There is no evidence that the Ball on SR when coming up hill jumps from the Record as we supposed, it probably does on Reg Rpder



Pierman had put a knife spring arm like on 5R - This made it loud (1" Dia) as $\phi \frac{1}{2}$ 1 5/16 + good mellow but has clatter + coing ~~only~~
The chamber is wrong need 1/4" hole or large space of arch part
I is now changing it somethin like XX cuts to make hole 1/8 + smaller chamber
I feel Convinced from this

Experiment that 1" dia is good + powerfy in the right direction & celluloid is good for its great range + lightness - I think the knife arm 3/4 can be made shorter + much lighter, making it quicker + reduces momentum. as to stop the clatter + coing the pressure must be increased its better to do it not by pressing on the long heavy arm but use a shorter arm.

The clatter + coing* on a chord of a piano must be due to lack of quickness in spring knife + dia + too much weight for the reason if we tighten spring to sharpen dia the coing + clatter on a ring dia ceases - but it sharpens it + diminishes its sensitiveness to overtones which appears to be necessary for mellowness + rich quality - The thing

*something to do with knocks

Apl 9. 1910

Wanted to have quickness & yet sensitiveness.

One thing that will help is to lighten the parts.

2nd Have Knife at Great cutting angle

3rd A rather small Chamber -

4th perfectly flat clear & level Knife Edges, -

5 A non flexing Center to the ring Dia

6 Proper position of Knife on record

1" with 1/8 hole same as sketch last page - its Loud as any for family Mellow, & by increasing pressure a little only slight Chatter, only on 1st hearing Chord - It has one peculiarity its uneven in Volume on Certain notes, these are high note cords and the same to these its abnormal loud showing something in Cone Reduced it before we made Chamber smaller, & reduced hole to 1/8 like sketch on back page

PHENOMENON

The talking is the clearest & best I have ever heard on the Phonograph Bar none.

no scratch, & Even Piccolo talked ordinary Voice - The pressure on disc forces it in Considerably

This is the Recorder par Excellence to Work with. -

If the Aluminum Center is replaced with a Celluloid & reinforced with a 2nd piece

Concerned as vibration in Wires on Pianos or Talking yet both loud

it will be OK. if in addition the lever is shortened + possibly lightened it will be better still. a Diamond Knife will be a gain - Cut 10/000 over the Center another gain.

By shortening the lever & lightening it & the Center of dia it will raise the pitch note due to the Kohale + will not probably respond to any note ~~on~~ on piano should it do so to very high pitch, we could use 004 Celluloid + even a shorter spring then it would be better

Possibly it wants a viscous Knife spring such as Celluloid spring or rubber instead of steel.

also Variations in inside dia of hole in diaphm + dia of nonflexing Center

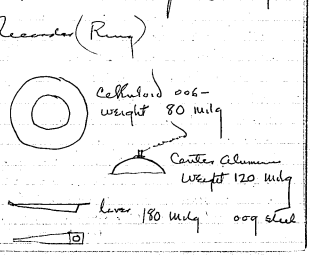
Note

It is always the same after all Kinds of Experiments on Recorders & Reproducers with large Dia + all Kinds of Changed Conditions the ultimate is found that under any Changed Condition the smaller or Reg 1 5/16 is best, with the general impression universal that larger Dia are best + louder Very little has been done below 1 5/16 — because glass or Mica used It is now clear that such Materials are not the ones to use low Elasticity like celluloid is wanted + very minute dia

I even think 1" celluloid on SR would behave better + fully as loud if Chamber made right like latest Recorder even the tube on SR possibly could be celluloid —

April 10. 1940

1" Recorder (Ring)



Apl 10 1910

1" same a celluloid of thick Reg Drawing paper only weighs 75 mlg to very much stiffer than the 80 of celluloid Have OK'd measure it,

Possibly the friction on knife edges would be too great, however this friction is a dampener + transfull suspension so to speak + a positive advantage

no doubt paper of 50 mlg would if right stiff be as stiff as 80 mlg celluloid

It looks to me now that Clatter on piano was peculiar to piano as the sudden starting of immense chords of great power throws the dia into complicated big amplitude waves which it cannot respond to if adjusted sensitive. the waves are half recorded + hence the clatter + echo —

If we increase the pressure to sharpen the dia its becomes quick enough to record the waves but in doing this we diminish sensitiveness + reduce the quality —

The only way I can see just now to diminish the clatter or rather get rid of it + still not have to sharpen the waves is to diminish the weight of the moving parts so they become quicker without spring pressure + perhaps change the chamber possibly making it smaller + the hole smaller —

The Diaphm could be made of celluloid or wax paper 1/2 the thickness. + then built up to same stiffness by corrugating —

The lever could be lightened by making it very short + of Mg or celluloid or rubber + silkoid paper

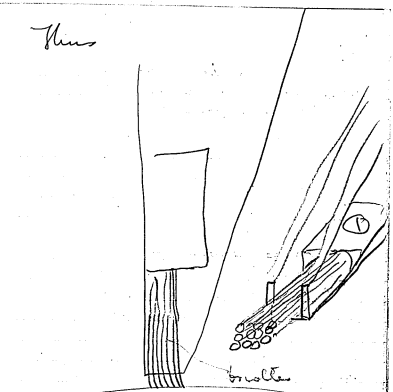
The weight of 1" previously tried

is probably 260 mlg
Think it can be reduced to
110 @ 120 & be even quicker —

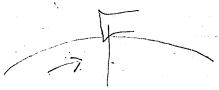
The weight of Celluloid
Dra 1 5/16 in Reproducer is
195 mlg without Center stiffener
Probably cut of the 1½ now
in SR is - 240 mlg
I think SR should have 1 5/16 instead
of 1½ & it would be better &
not wear record so much, possibly
1"

Indian Hog bristle in a fole cleaning
brush vary from 5 to 10/1000 dia
perfectly round & very stiff
~~[illegible]~~ with 6 or 8 & 1/8 Edenmon oil
from Halder think they will
support 1⅛ oz in SR they
certainly would track the
record perfect a wear ark
on Moulan cut legat they cover
the grooves

Thus

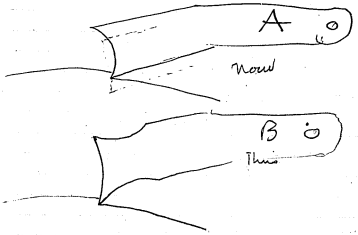


It is almost certain that the knife edge should be set just over the Center, not on or this side of the Center



When there is no tendency for large waves to draw knife in further than it should go - in other words set as is universal in Machines just above the Center the tendency that is to throw out the tool + not to dig in -
We can only do this by having a moveable adjustment + I say we have guessed at it heretofore, whereas the art, the utmost importance, its have it accurate

I also believe our knife should be backed off



Suppose both were standing still, now put weight on both which would either the wax the deepest of course when wax deadens the def yet A hasn't the sharp Edge of B + must requirements power — The cupping should be so that when knife

at proper angle the
Cutting Edge is belvaigll +
not bached off to permit it
to gouge in

Notice on 1" piano cohce tenoin was
increased to stop Chatter + only the base
was very much changed, + not at all Mellow
but cohce it was more sensitive + had
Chatter etc on big Chords base was
Oll + Mellow - Sharpening is noticed
more Easily on base tonge than on high
pitch

25
300
7500

44 cells. 880 — 60 cells 480
165
165
165
165
165
1765 — 240
1155
165
164
165
165
165
Rnd 12 yrs 2145 — 720

196 amp Pb $10 cell net,
50% of renewals

Supposed cost, 750 cells - renewals 25% per yr

750
24
3000
3000

167 | 446 (2.4
9 cents amp list

26 | 175 (6.7

150 | 1350 (9.

204

240
204

2.

135 | 288 (2.13

135 | 2430 (17.2

$$12\overline{)2090} = 340 \text{ and } 6$$

$$\overline{)166} \times 12 = 332$$

$$166 \times 3 = 498$$

$$166 \times 5 = 830$$

$$\begin{array}{r} 56 \\ 21 \\ \hline 77 \end{array}$$ - Cost - with bags 70 c

2 million = 166000 Worth -

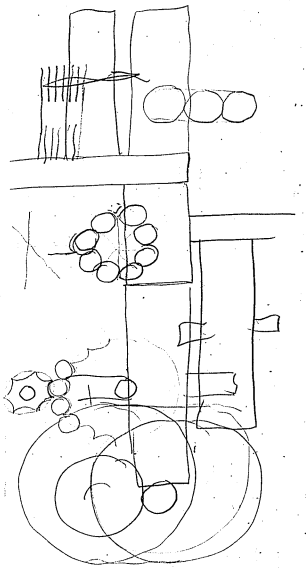
Cost 70 - average selling

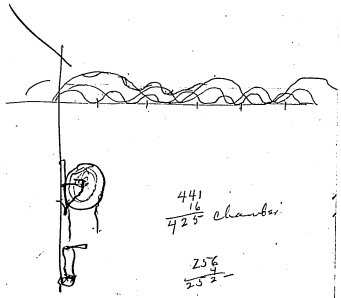
		Profit
	70	00
	73 -	4980
	75	8300
	80 -	16600
	85	27 and 00

$$\begin{array}{r} 27 \\ 12 \\ \hline 54 \\ 27 \\ \hline 324 \end{array}$$

Saving Rule
Flake 25 –
Ai 20 –
Fe 25
5

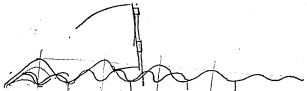
75





441
16
425 chamber

256
7
252



1350
20
2700

1320
200
1080
20

1080
19
1061
900
1.69

10 900

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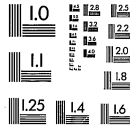

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